June 2018

horses and people

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How to Get Motivated!

Put a Helmet On!

20 reasons to embrace the skid lid

The COLIC Mystery

Keep your horse safe

Embryo Transfer

Vets review the ethics & future P. 56

CHECK IT OUT!

- Create a biodiverse haven at home
- Making sense of soil test results
- Horses and people art: Marengo Mystery

STARTING ROMEO SHOULDER CONTROL

Get in the groove with your horse! P. 70

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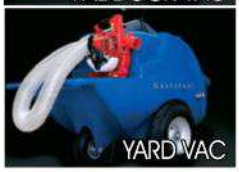

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From the editor

Welcome to the June issue of Horses and People Magazine. I can't quite believe we are already half way through the year!

The sustainability of horse sports is being put to the test with several incidents mobilising huge waves of international public uproar. Last month, we covered some of the issues that relate to the use of restrictive equipment, in particular nosebands, which over the last few decades have become increasingly tightened without deep enough scrutiny.

We know tight nosebands impact on horses' welfare, but they also mask poor training practices at the expense of good training. At Horses and People, we began reporting on nosebands in 2011, and it is encouraging to see the public worldwide is now much more aware and educated on this issue.

Not only educated, but they are also prepared to advocate for the horses. Our hyper-connected, social media-driven world is giving people a voice and, being backed up by solid scientific evidence, these issues demand meaningful change.

Earlier this year, we reported the Danish Riding Federation had taken the lead in establishing a limit to noseband tightness and, in the last few days, we are witnessing the emergence of a mass people-driven movement in New Zealand to introduce similar rules in their country. We will be watching the outcome with great interest.

We are also in the midst of seeing changes made to the rules regarding the use of the whip in eventing, which also came as a result of the public outcry regarding the use of the whip on, what appeared to be, an extremely tired horse at one of the pinnacles of eventing, the Badminton Horse Trials.

In this issue, Georgina Downey's look at the Mystery of Marengo recounts the massive deaths of cavalry horses in past centuries wars'. Seemingly inconceivable today, it acts as a reminder that social licence is fluid and, if we are to continue using horses for our own recreation and sports, we must regularly evolve to match social expectations on their welfare.

As an educational platform, it is our mission at Horses and People to continuously share information that empowers you to do better, to be the change our horses need. We have your back as you drive positive changes for the sport we love.

In this issue, we continue David Stang's fascinating series on our horses' longeared cousins, donkeys and mules. I hope you are as captivated by these amazing, stoic characters. From the discussions in our own office, I think we are already hooked!

Sustainability of horse sports goes hand in hand with the sustainability of our environment, and this is why it is such a privilege to work with progressive and practical contributors in our property management areas.

This month, Jane and Stuart Myers make it feasible to increase the biodiversity on our own horse properties, with practical advice to ensure it is a win-win-win situation for ourselves, our horses and our land.

In addition, Mariette van den Berg helps us make sense of laboratory soil test results to improve your land. I, for one, will be keeping her article on hand as a very useful reference!

We welcome Dr Morgan Weber to our pages with an honest appraisal of colic; so common but, as she explains, also so mysterious and frightening for us horse owners.

This article ties in well as we re-visit Dr Anne Beasley's explanation on the potentially deadly effects of cyathostominosis which can only be avoided with an up-to-date and responsible worm control program.

We have commissioned Sonja Vandenmark to report on the highlights on a set of special features published in the Journal of Veterinary Science that discuss the ethical aspects of advanced reproduction techniques, such as embryo transfer.

Inside this issue, we are also reminded of the inherent dangers of horse riding and the steady rates of injury. Only weeks before publishing her article on the importance of wearing a helmet, Dr Kirrilly Thompson suffered a fall - a sharp reminder that we must always be prepared for the risk of injury.

Kate Fenner continues her series on starting Romeo. An invaluable set of articles, she provides the foundation lessons young and untrained horses require for the basis of lightness and self-carriage. Even if your horse hasn't learned these principles, it is never too late to re-train these essential lessons.

In her honest account, Jill Griffiths admits to making mistakes with her young horse, Dante. Just like her, each of us has made similar errors in judgement, second-guessing our horses behaviours where pain is the underlying factor.

And, Tanja Mitton reminds us we all need help maintaining our motivation, with her trademark practical advice.

I hope you feel re-energised and inspired to enjoy your horses this month. All the best,

Cristina

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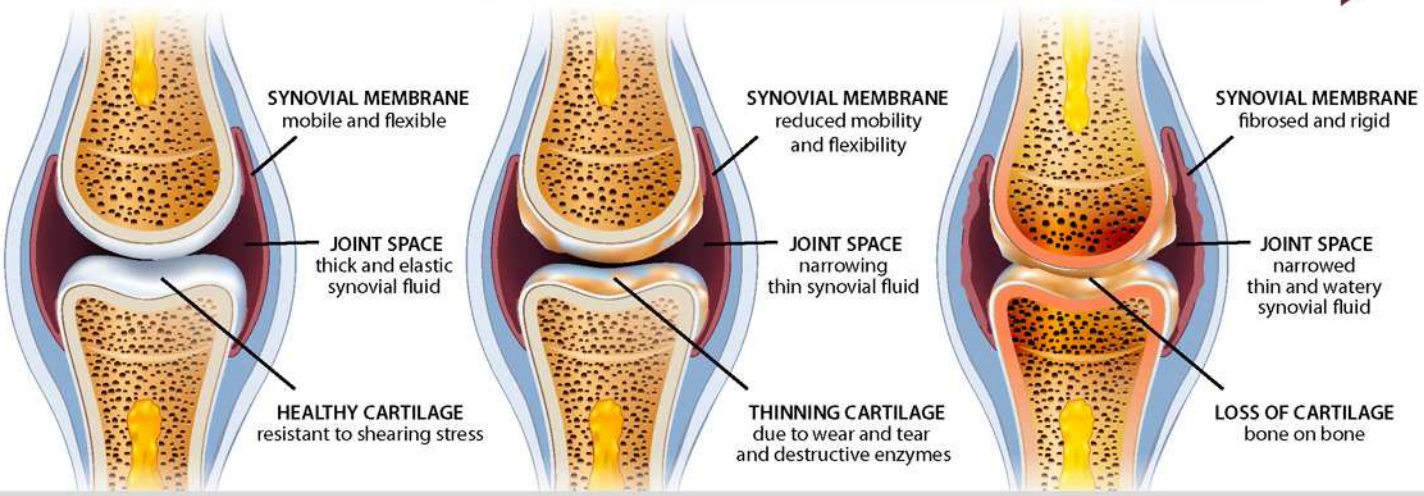

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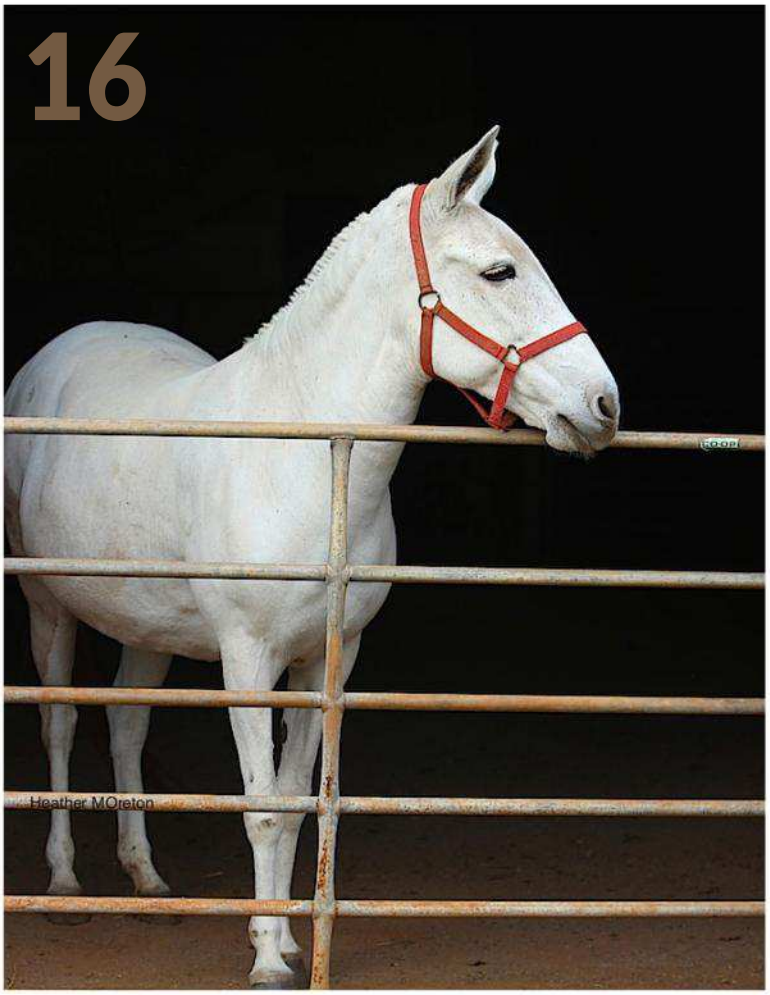

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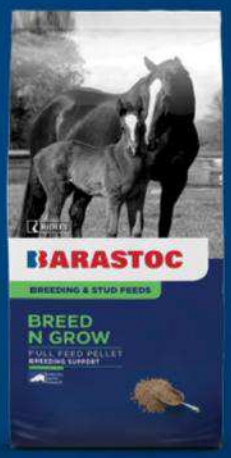

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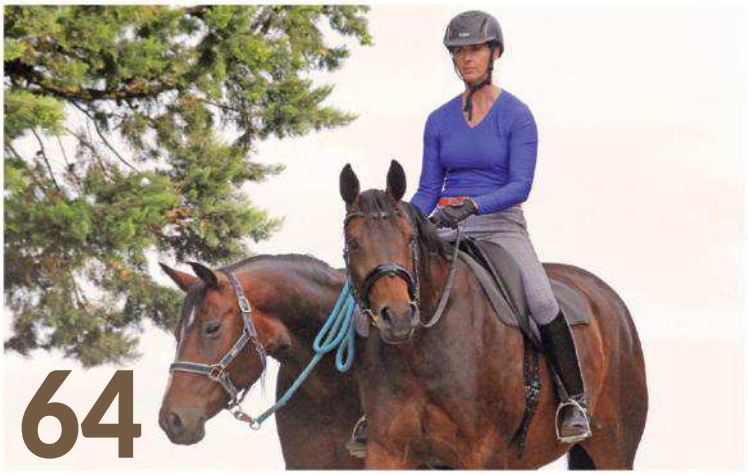

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Dr DAVID STANG

David's love of horses and mules began in the first grade, when he read every book about Billy and Blaze that his school library had. David has earned a living as experimental social psychologist, college professor, book author, computer virus researcher, computer security expert, and software developer. Those careers ended with the sale of his company and the anti-spyware product he wrote. Since then he has been a devout trail rider. He's written a pretty thick book on horses, and has built a website showing the 200 horse trails nearest his house MontgomeryRides.com all of which he hopes to ride this year with his partner Freckles.

JILL GRIFFITHS

Jill is a freelance writer specialising in agriculture and environment. She has a BSc in Biology and a Graduate Diploma in Journalism. Through her work, Jill is fortunate to interact with leading researchers across Australia, providing her with access to current research in many fields. A life-long horse lover, Jill came to horse ownership in mid-life and currently shares three horses with her daughter. She enjoys groundwork, trail riding, flatwork, and hanging out with the horses in the paddock. She also harbours ambitions of one day riding endurance on her young horse, Dante.

JANE & STUART MYERS

Jane and Stuart Myers are the dynamic duo behind Equiculture - an educational movement informing horse owners on responsible, sustainable and ethical horse-keeping. Together, they have co-authored several books, and travel regularly throughout the United Kingdom and Australia. Jane is also a riding coach - known by many as 'The Horse Rider's Mechanic'. Her tertiary achievements include a Masters thesis in the grazing behaviour of horses from the Royal (Dick) School of Veterinary Studies and a Churchill Fellowship.

HETTY TAPPER

Hetty is a clinical herbalist specialising in healing animals. She has also completed training in aromatherapy, homeopathy, energy healing, tissue salts, body work, massage, communication, meridian and charka work, and much more. She enjoys healing horses naturally and has helped many horses that were abused, sick or just misunderstood. Hetty has written two books - 'Equine Lore' and 'Healthy Horses Holistically and Herbal Horse Health' - to show how we can all learn to help and heal our horses naturally. Her aim is to bring healing back to where it belongs - "with everybody".

Dr MORGAN WEBER

BVSc (Hons) MANZCVS (Eq Medicine)
Morgan is from Maryland, USA. She graduated with honours from the University of Queensland in 2008 and completed an equine internship at Ballarat Veterinary Practice. She then worked in Western Australia before joining the team at Newcastle Equine Centre. In 2013, Morgan passed her membership examinations in Equine Medicine. Her main areas of interest are equine medicine, anaesthesia, and dentistry. When not at work, Morgan enjoys playing soccer and spending time with her husband and newborn son.

ANNE-PENELOPE MURRAY

MURP, BA(psyc.), Post Grad. Dip
Anne grew up on a sheep and cattle property in southern Queensland where she rode horses and developed a love of animals. She studied Photography and Art and, after travelling, she returned to study Psychology - undertaking a number of ethology and zoology subjects. From an early age, Anne has been interested in painting, photography and drawing, and has successfully exhibited and sold her work. Anne contributes an original illustration each month for Jill Griffiths' Green Pony feature.

Dr MARIETTE VAN DEN BERG

BAppSc (Hons), MSc, PhD (Equine Nutrition), RAnNutr
Mariette van den Berg is a registered equine nutritionist, dressage rider, equestrian official and certified permaculture designer who completed a Masters in Animal Science at the Wageningen University in the Netherlands and a Thesis in Equine Nutrition at the Massey University in New Zealand. She is founder of MB Equine Services, and recently completed a PhD in Equine Nutrition and Foraging Behaviour at the University of New England in Armidale, Australia.

KATE FENNER

BEqSc (Hons)
Kate is an Equine Scientist (Charles Sturt University), PhD candidate (Faculty of Veterinary Science, University of Sydney), equestrian coach (Equestrian Australia and British Horse Society) and horse trainer (John and Josh Lyons Certified Trainer). Kate has ridden, trained and competed in Dressage, Jumping, Western and Polo in Australia, Europe, the United States and Asia.

TANJA MITTON

Tanja Mitton is a riding coach and NLP (Neuro Linguistic Programming) master coach with over 25 years of coaching and competition experience. She has been working with the Australian high performance squad as a mindset coach and, in 2012, was invited to the Australian Institute of Sport to present a workshop on how to improve the Mindset of Australian Coaches. Author of the book 'Seven Steps to the Mindset of an Equestrian Champion', Tanja conducts clinics all around Australia and her seminars have been approved by Equestrian Australia for NCAS coach accreditation points.

LINDA ZUPANC

Linda Zupanc has been a horse lover since early childhood, playing polocrosse as a junior, dabbling in dressage and CTRs, and generally riding for her own pleasure. Her enthusiasm for horses and people has led her to hold various positions with the Queensland Horse Council for nearly a decade. She took up photography three years ago as a hobby to share with her husband, and found she enjoys the technical and creative challenges. Linda joined the Horses and People team in 2014 and is now living the dream.

SUSAN BIDDLE

Susan Biddle, this month's cover photographer, was a Washington Post staff photographer for thirteen years and now freelances for the Post as well as other publications and organizations. As a White House photographer, she documented the Presidency for the last year of the Reagan administration and all four years of the George H.W. Bush administration. She has won awards with White House News Photographers Association and National Press Photographers Association. As a young girl she remembers riding ponies along Rotten Road in London's Hyde Park!

Dr ANNE BEASLEY

BAgSc (Hons), PdD
Anne Beasley is a postdoctoral Research Fellow and Lecturer of parasitology at the University of Queensland's School of Veterinary Sciences (Gatton). She has studied parasitology of ruminants and horses and conducted the first study on macrocyclic lactone resistance in Australian horses, one of several areas she continues to research.

Dr GEORGINA DOWNEY

Georgina is an art historian who has published extensively on the domestic interior. Her books include Domestic Interiors: Representing Home from the Victorians to the Moderns, (2013) and Designing the French Interior: The Modern Home and Mass Media (2015). Integrating her love of horses and riding, recent publications include 'Unstable relations: horses in interior spaces' for the Australasian Animal Studies Association 2015 conference and, 'Becoming-horse in Contemporary Art' forthcoming, for Artlink. She is the human of Classic, the dressage schoolmaster, and Angas the Cairn terrier.

SONJA VANDERMARK

Sonja Vandermark is passionate about equine science with a focus on equine nutrition. She has a BSc (Hons) degree in Equine Science and Technology from the UK and has worked in equine nutrition research and the feed industry for many years. She currently operates a small horse complex in Western Victoria and enjoys studying and practicing equitation science with her own horses as well as keeping abreast of equine research across varied fields. Sonja enjoys translating the 'science stuff' to everyday language and is leading us through many complicated peer reviewed papers over the coming months.

Dr KIRRILLY THOMPSON

PhD (Social Sciences)
Dr Kirrilly Thompson is a cultural anthropologist, independent research consultant, dressage rider and President and Chair of the Board of the Horse Federation of South Australia. She has published over 100 journal articles, book chapters and industry reports. Together with Lynda Birke, she is co-author of the new book '(Un)stable relations: Horses, humans and social agency' (Routledge, 2017) which explores the practical and ethical implications of recognising horses as social agents in human-horse relations.

SALLY HARDING

Sally Harding is a writer and photographer from the north-east border of Victoria who is fascinated by the horse-human relationship, and the many different ways people enjoy and understand their horses. She is discovering the best stories come from the horse's perspective and the relationship people have with horses is often a reflection of their own human experience.

FREE

FREE 30 DAY ACCESS: Tongue Over the Bit

The traditional approach to dealing with a horse that puts their tongue over the bit is to use restrictive equipment, such as a tight noseband, a correction bit or a tongue tie - all of which impinge on their welfare. This month, we're offering free access to 'Why Does My Horse... Put His Tongue Over the Bit?' in which two world renowned horse trainers and equitation scientists, Dr Andrew McLean and Kate Fenner, explore the ethical alternatives that prioritise horse welfare and great horsemanship. View more online at: **https://www.horsesandpeople.com.au/article/why-does-my-horse-put-his-tongue-over-the-bit**

NEWS

New Equine Influenza Vaccine Now Available For Horses

For the first time in 25 years, a new equine influenza vaccine has been developed. An initial study of the live-attenuated vaccine has shown it to be safe and more protective than any other vaccine presently available. While Australian and New Zealand horse owners aren't required to vaccinate, the devastation of this transmittable virus was felt on our shores in 2007. For horse owners where flu outbreaks are common and vaccination is necessary, the release of a new flu vaccine is a welcome breakthrough. View more online at: **https://www.horsesandpeople.com.au/article/new-flu-vaccine-now-available-horses**

NEWS

Biological Worm Control: From Innovation to Reality

Using nature to fight nature, rather than chemicals, BioWorma has been dubbed a game-changer in worm control and the continuing battle against worm resistance. After more than 20 years of research and development, Australian and New Zealand farmers and horse owners will be the first in the world to access this new product, recently approved by the APVMA, which uses a natural strain of fungus - *Duddingtonia flagrans* - to seek out and 'trap' the larvae of many of the parasites that are common in horses. View more online at: **https://www.horsesandpeople.com.au/article/biological-worm-control-australian-innovation-now-reality**

FREE 30 DAY ACCESS: Resistance on the Rise

Despite the promise of emerging products such as BioWorma, worm resistance remains a concerning issue that affects all facets of the equine industry. This month, we're offering free access to 'Resistance on the Rise' by Anne Beasley in which she documents her findings from a recent Australian study into worm resistance and offers practical advice to horse owners, including those managing foals and mature horses, to ensure all work together to build an effective and sustainable approach to parasite control. View more online at: **https://www.horsesandpeople.com.au/article/resistance-on-the-rise**

The Mystery of Marengo

WORDS BY Dr Georgina Downey

The life of a war horse in Napoleon's Grande Armée was hard, dangerous, and usually short. Nearly a quarter of a million French cavalry horses died on campaign between 1805 and 1815. Most of these were killed during his disastrous invasion of Russia in 1812.

Tens of thousands were shot directly by the enemy, as they were easier targets than riders. Others died through the absence of proper food, shoeing and veterinary care while on campaign. The Registry of Horses, kept by the Imperial Stables, Versailles, suggests that horses lasted only an average of four years in the general cavalry.

ABOVE: Theodore Gericault, Cheval Arab Gris-blanc, c. 1812 private collection. Image source: www.wikimedia.org.

ABOVE: Theodore Gericault, Head of a White Horse, c. 1812-15. Image source: www.wikimedia.org.

However, one of these horses has lived on in legend since the 1830's - Napoleon's favourite charger, 'Marengo'.

A small, grey Egyptian Arabian stallion, Marengo was believed to have carried the Emperor Napoleon through every campaign, up to the Battle of Waterloo. In June 1815, the brave little stallion was captured alive by the English and put on display in Pall Mall, London.

But, there is one problem with the myth, since no 'Marengo' is listed in the meticulously kept French Registry. Jill, Duchess of Hamilton, suggests 'Marengo' was actually probably a stallion called L'Ayley or 'Ali'. Napoleon gave favourite horses the pet names of successful past battles, such as 'Marengo', 'Jaffa', 'Austerlitz', 'Wagram', and so on. His own battle horses were also nearly all Arabs or Barbs, in shades of trout, slate, dark, dirty, pale, blotchy, dappled, spotted, light, dark grey with white spots, mouse, ash, mirror, mixed, white-grey and clear grey - nearly, but not quite, 'Fifty Shades of Grey'!

On the left, Gericault depicts L'Ayley standing proudly, showing off his excellent conformation, tense nostrils, alert ears, bright expression in the eyes and strongly muscled loins. This is a horse brave enough to have survived five battle wounds, and who got to England still with a bullet in his tail.

On the right, in 'Head of a White Horse', a work of the imagination, but based on a little known print of L'Ayley by Vernet, he looks right into our eyes. Gericault even capturing the slight wrinkling of his nostrils as he makes a little breathy snort, as if to welcome us.

All his chargers were carefully trained, due to Napoleon's riding style, which would have tested any sensitive horse to the limit. Unlike his fellow mounted officers, Napoleon only had a year of dressage lessons at the Military School in Paris from 1784 to 1785, and it was not enough to give him an independent seat. He rode by instinct, banging his bottom on the saddle and dangling his legs, wearing out his breeches and the backs of his horses. As Phillipe Osche has written: "It is impossible to say that Napoleon loved his horses. He was interested in them, he liked to have good horses, but he seemed to have little feelings toward his comrades".

In honesty, we may never know who the real Marengo was but, with L'Ayley, we are certain he belonged to Napoleon. He was beautiful enough to be painted by Gericault, France's greatest artist of the Romantic period and the shadowy backgrounds in both works are consistent with the period 1812-15, when Gericault spent time drawing and painting the horses of the Imperial Stables, Versailles.

Incredibly, while Gericault died in 1824 from a riding accident, L'Ayley or 'Marengo' outlived his portraitist, surviving in retirement in England to a great age (38) and, after his death, his skeleton was donated to the state and is now at the National Army Museum in Chelsea, where it is one of the most loved objects on display.

Ears forward and eager to work, packing is a good job for mules. They are strong and sure-footed. Photo by Linda Zupanc.

Mules: Part 2

WORDS BY David Stang
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Introduction

I wanted to write a nice little article on mules, explaining them to those who know horses. There is plenty of conventional wisdom on the subject, but on closer examination, it all seems to be the same and distil down to not much. There is very little science comparing donkeys, mules and horses, and many of the topics covered here deserve better than they have been given.

The little science that has been done reveals some of the conventional wisdom is dangerously wrong. Direct observation can help fill in the gaps, so when there was no science I could find, I've resorted to telling you about my new love, my mule, named Freckles.

Last month, I explained the origins of donkeys, mules and horses, and the unique differences in their intelligence, appearance, diet and disposition. In case you missed it, you can read it online at: https://bit.ly/2leeh78. This month, I continue my discussion on the distinctive adaptations of today's donkey, mule and horse.

Agility

Courage comes from more than a heritage of not running away from trouble. It also comes from knowing where your feet are, where to put them and how to put them there. I've encountered many reports that "A mule, like a donkey, can see all four feet while facing forward, but a horse facing forward can see only its front two feet because of head shape."[1] This seems to be a common opinion, but I haven't found anything that smells like science on this and I don't think it's true.

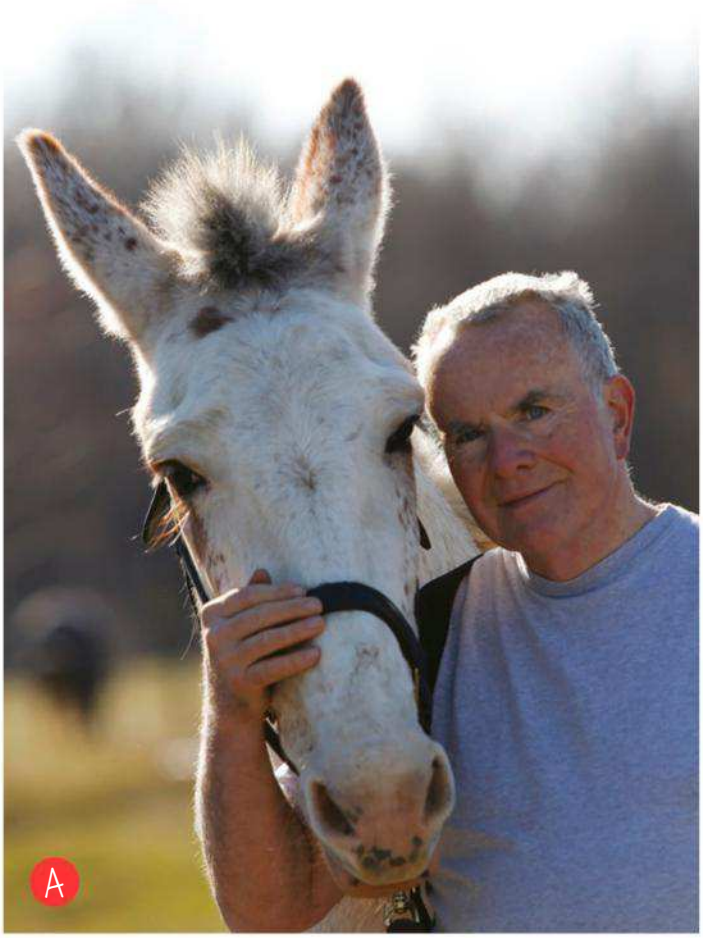


IMAGE A: David Stang with his new love, his mule named Freckles. Photo by Susan Biddle.

IMAGE B: What a mule can do with four feet is amazing. According to one source, "Since the mule trains started traveling the canyon in 1922, no mule has ever gone over the side. Image source: www.pixabay.com.

What seems more likely is a mule monitors the changing surface as they pass over it and remembers the terrain briefly, allowing them to visualise that terrain as their feet reach it and to choose where they're putting their feet[2]. We do this with two feet; with four doesn't require a change in skull shape, just an improved set of cognitive skills.

What a mule can do with four feet is amazing. The Grand Canyon experience is probably adequate proof of this. Depending on the route taken, the distance from rim to river is about one mile, so a trip to the bottom and back is two miles of elevation change.

According to one source, "Since the mule trains started traveling the canyon in 1922, no mule has ever gone over the side. Through the years, more than 800,000 mules and riders have made the trip down and up without a mishap."[3] 800,000 trips with a two mile elevation change is 1,600,000 total miles of altitude change on narrow, rocky trails. That's around the Earth 64 times.

But, "without a mishap" is likely a small exaggeration. I found a story about a mule that fell on a canyon ride and rolled over his passenger, injuring her.[4] However, this one injury compares with the 770 people who have died in the Grand Canyon while not on a mule[5].

You should spend some time looking at YouTube videos resulting from a search of 'extreme mule'. It is hard to imagine any other animal carrying a human over this stuff. Climbing a pile of loose rocks takes more than a good pair of sneakers.

Independent thought

Mule skinners - those who can 'skin' or 'outsmart' a mule[6] - have called mules "900 pounds of free enterprise". And Harry Truman, a former United States President, who grew up with mules, once said: "My favourite animal is the mule. He has more horse sense than a horse. He knows when to stop eating and knows when to stop working."

Mules can't be bribed. My horse learned clicker training and target training in a single session, soon learned a dozen tricks and, over our decade together, probably scored a thousand pounds of sliced carrots.

When I met my mule, Freckles, I discovered she didn't want a carrot slice. Didn't want an apple. Didn't want a grape. Didn't eat most of her grain. At first, I thought this was a defect in her early education, one which experience would overcome. But, I've tried. While she will sometimes take a snack when offered, she is as likely to turn it down.

It is difficult to coerce a mule, too. I tied Freckles to a fence post the other day while I went into a pasture to visit with another horse. When I came back, Freckles had untied herself, but was standing calmly exactly where I'd left her, waiting for me. Go figure.

Clicker training doesn't work if you can't find a reward to give the click meaning. So, we aren't working on our tricks these days. But, Freckles can do every single obstacle on any obstacle course, mounted or in hand, pausing at the obstacle, or proceeding through it or backing through it. It makes me happy to think I'm not the boss and I've partnered with so much free enterprise.

Reacting to pain

Pain is one of mother nature's ways of guiding behaviour and there is no reason to think any equine would be exempt from it, or not experience it. Equids all benefit from not putting sharp objects in their eyes or lounging on barbed wire. So, it is not in pain, but in the expression of pain, that humans and equids differ.

Humans seem very articulate at such expression, but equids remain quiet when the same disturbances affect them. Some of this silence comes from our own deafness - not being able to 'read' the signals our horse is sharing. However, most of the silence likely comes from the nature of all living non-human things - who avoid predation by not revealing injury and who do not live in the company of those who could help if they knew that help was needed. It is true there are stories about dolphins and dogs helping each other, but the wild world usually works to hide injury.

Horses do, in fact, reveal pain with their facial expression. Horses and People has published a number of reports on the 'Equine Pain Face' and the 'Horse Grimace Scale'.[7] And, horses may reveal pain with their behaviour. They may show restlessness, agitation, and anxiety; they may assume a rigid stance, and be reluctant to move; they may lower their heads, hold a fixed stare with dilated nostrils and a clenched jaw; and they may show aggression toward handlers, other horses and themselves.

But, in a summary of 19 studies, researchers found none of these signals is evident or easily detected in a donkey.[8] Mules seem to acquire much of their father's toughness. Mules and donkeys will almost certainly experience pain the way you and I and horses do, but they are less likely to reveal it.

This does not work to their advantage. Studies of equine health in underdeveloped countries typically find high rates of wounds in working equines, particularly in donkeys and mules.[9] Something is certainly not right when over half of the animals examined have obvious wounds.

> What a mule can do with four feet is amazing. The Grand Canyon experience is probably adequate proof of this. Depending on the route taken, the distance from rim to river is about one mile, so a trip to the bottom and back is two miles of elevation change.

Adapted to heat, not cold

Donkeys adapt to the heat, in part, by letting their body temperatures rise. In one study, body temperature in cool early morning hours was as low as 35.5°C, (95.9°F). Body temperature reached its maximum at noon at 39.0°C (102.2°F), with ambient temperature ranges of 16-40°C (60–104°F).[10] In another study in which donkeys were dehydrated for 36 hours and then walked for 12 hours in the desert at a rate of 70-80 meters/minute, body temperature did not rise above 39.2°C (102.2°F).[11]

The cold, on the other hand, may pose more hypothermia problems for donkeys than horses.[12] Conventional 'wisdom' says mules and donkeys are tough, and can handle the cold just fine.[13] But, a donkey's evolution in hot places should not lead to such a conclusion and some research points to hypothermia risks for donkeys in temperate climates.

Researchers in Saskatchewan[14] studied admissions of horses and donkeys to their veterinary hospital, and concluded donkeys were more likely than horses to be suffering from hypothermia. Their analysis found hypothermia in donkeys was apparently unrelated to diet, disease or management.

Britta Osthaus[15] and her colleagues studied the hair coat properties of donkeys, mules and horses in four seasons in the United Kingdom. They found the hair weight per square inch - a clever way of measuring how thick a coat is - changed through the seasons for horses and mules, but not for donkeys.

IMAGE A: A group of mules make their way through the Grand Canyon. Image source: www.wikimedia.com.

IMAGES B & C: Horses and mules grow a Winter coat, but donkeys do not. Per square inch, mule coats were always lighter than those of horses, but the difference was greatest in the Winter. Images courtesy Faye Brown.

IMAGES D & E: Freckles can do every single obstacle on any obstacle course, mounted or in hand, pausing at the obstacle, or proceeding through it or backing through it. Photos by Cindy Brasfield courtesy David Stang.

When I brought my new mule, Freckles, home from Alabama, I found several local farms feared mules and horses wouldn't mix. But, wherever horses and mules are mixed in a pasture, they settle down to solid friendships. Horses don't hint that they find a mule's look odd, and mules don't seem to mind that a horse's ears are too short.

Horses and mules grow a Winter coat, but donkeys do not. While mules grow Winter coats like their mothers, in this study, the coats were not has thick as those of horses. Per square inch, mule coats were always lighter than those of horses, but the difference was greatest in the Winter.

Horses, mules and donkeys may all need blanketing in the Winter. Donkeys may need it the most, because they don't grow Winter coats and because their smaller mass generates less heat. Mules don't grow Winter coats as lush as those of horses and may need blanketing more than horses do.

Strength and stamina

There is no doubt equines are strong, and common lore has it that donkeys and mules are particularly strong. According to one source, oxen and buffalo can pull a load that is 12% of their bodyweight, camels can pull 18% and donkeys can pull 24%.[16] This topic quickly gets off into the weeds with discussions of tractive effort, foothold, grade, duration, resistance, training, and so on.

Larger equines can pull more than smaller ones, and the record pulls in one competition were 7,700 pounds for a mule team and 10,500 pounds for a horse team.[17] Considering the mules likely weighed about half what the draft horses weighed, such results suggest strong mules are stronger than strong horses, pound for pound. While hybrid vigour likely gives mules more horsepower per pound than either horses or donkeys, the number of variables that affect measures of strength make this topic best suited for bar fights.

Disposition

Horses are 'spirited'. Donkeys are mellow, docile. Their small size makes them easier to manage than horses.

When I brought my new mule, Freckles, home from Alabama, I found several local farms feared mules and horses wouldn't mix. But, wherever horses and mules are mixed in a pasture, they settle down to solid friendships. Horses don't hint that they find a mule's look odd, and mules don't seem to mind that a horse's ears are too short. After all, mules loved their mothers. It is the humans supervising the equids, and not the equids themselves, that have the issues.

Add one mule to your band of horses, and your band will grow by one. Mules and horses routinely form strong interspecies bonds.[18]

This does not mean a mule in a herd of horses will forget who they are or would prefer to hob nob with the horses. Researchers who studied a group of 16 mules, donkeys and ponies found different equids formed distinct affiliative groups within their respective herds.[19]

Stubbornness

Mules are famously stubborn, but a closer look leads me to think humans are famously stubborn. We want a mule to go left. The mule wants to go right. We try to get the mule to go left. The mule tries to go right. Who, exactly, is stubborn? To us, any disobedience is stubbornness. What intimidates a horse may only anger a mule. A different management style is required if you plan to succeed with a mule.

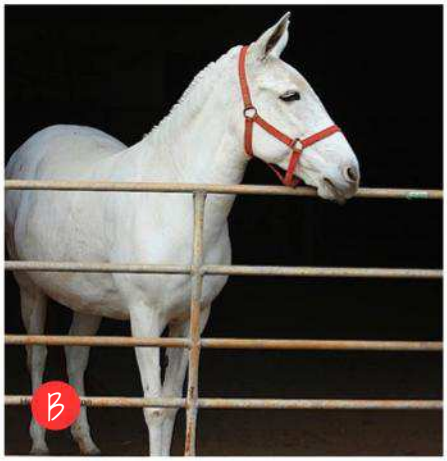


IMAGE A: While their conformation is similar to a horse, mules have critical differences that need to be considered to maintain their health. Image courtesy Faye Brown.

IMAGE B: Grey mule by Heather Moreton. Image source: www.wikimedia.org.

IMAGE C: Juancito, a mule from Argentina where the military still actively breed them. Image source: www.wikimedia.org.

IMAGE D: There may be hypothermia risks for all equines, but donkeys - which evolved in hot places and don't grow winter coats - may be most at risk. Mules grow lighter winter coats than horses, and may also deserve some extra winter care. Image source: www.wikimedia.org.

Mules are famously stubborn, but a closer look leads me to think humans are famously stubborn. We want a mule to go left. The mule wants to go right. We try to get the mule to go left. The mule tries to go right. Who, exactly, is stubborn? To us, any disobedience is stubbornness. What intimidates a horse may only anger a mule. A different management style is required if you plan to succeed with a mule.

The mule's opinion is often right. My mule and I have been on many trail rides where I would have missed the turn, but she made it anyway, or where I tried to turn and she (correctly) chose to take another route.

I ride without a bit, and don't use a bitless bridle either. I use a halter, a roping rein and a rein keeper, and on the trail, only ask to influence at intersections. She is my smart travel companion, with good opinions, and I don't need to do any micromanagement on the trail. Of course, when she thinks we've gone far enough - particularly when we are just starting our trip - the libertarian in me gives way to relentless tyranny.

When I bought Freckles, I was told how to catch her in her pasture by luring her with a bucket of grain. It has taken me a little time, but I soon realised her initial impulse when I was heading in to catch her was to seek the safety of her little band of mares.

If I kept coming after her, she kept evading me. But, if I could just relax and be more horse-like, things would change. A minute or two after getting to safety, she'd begin to relax, and a minute or two later, she'd walk some yards away from them and wait for me to approach.

Now, I catch her on her own terms, when she is ready to be caught. And, for her concession, this is sometimes less than a minute after I've reached the gate of her pasture. The appearance of stubbornness might be created by our own timetables, our own aggressiveness, our own insistence in always getting our way. Horses are docile and easily intimidated. Mules need a little respect. Mule skinners are not so much mule whisperers as they are mule listeners.

Freckles doesn't always have a strong view on which way we should go, and neither do I. Recently, we went for a long walk through dense woods - all six feet on the ground - and we both lost the trail. I could tell she was lost, and I could tell she could tell that I was lost. When I made a suggestion that we try this way, she willingly acknowledged she had no better idea. We got unlost just in time to write this article, thank goodness.

Fear the mule?

Some folks fear mules, believing them to be good kickers. To hear the stories, a mule can touch any spot in a nearby county with any hoof, even if the farrier has them standing on three legs.

In my experience, mules are just as predictable as horses. They won't ever injure you without warning you first. I once offered to help a woman with her stressed mule, who had been tormented for an hour in a mule clinic because he didn't want to do what was being demanded. Remember, mules are independent thinkers and won't always think your idea is the best one. They were in a stand-off, and judging from the woman's behaviour, the mule was winning. To this end, the clinician was growing embarrassed.

This mule was in a sweat and was sent off with his owner to a round pen, to work it out. I offered to help. The mule felt I needed to know how he was feeling, and the next thing I knew, a front hoof was on my chest. I was amazed he could reach so high with a front hoof, move so quickly and plant a hoof with such gentleness. He could have killed me. Instead, he warned me.

Half an hour later, he was doing in the round pen all of the exercises they were doing in the clinic, and that afternoon, he re-joined the group as a model citizen.

Anyone who educates a mule with a 2x4 has reason to be concerned about their welfare. Anyone who uses a twitch takes their life in their hands. Mules will remember. They're bigger than you. They might be smarter. And, they may get even. But, anyone who loves their mule will be loved back.

A loved mule will protect you and take care of you on the trail. You can stand behind her, casually put your feet next to hers, lie down under her, let her take a carrot slice from your lips. Don't tempt fate on my advice, but do know that a mule can be as trustworthy as your dog, just not as foolishly obedient.

Geographic distribution and lifestyle

The anatomy of a donkey suits it for a life in harsh desert conditions and the third world, where there is little to eat and much work to do. Strong jaws and their digestive system help them get by on roadside brambles in the underdeveloped world where even their owners don't have enough to eat.

Strong hooves that grow at the rate they wear comes in handy for an animal that will never see a farrier or a vet. Studies have shown donkeys are much more economical than humans at carrying loads or cultivating, and more economical than tractors or oxen at pulling them.[20] The underdeveloped world knows this.

When Central and Western Australia opened up in the 1860's, donkeys proved valuable for hauling freight through areas where horses and oxen would perish. Donkeys could endure water shortages and did not seem to be affected by plants that were poisonous to horses.

Nonetheless, when cars and trucks came along, the teamsters - those who drove and loved their teams of donkeys - released their teams. Five million feral donkeys now prosper in Australia and are among the ranks of unwanted introductions, including cane toads, red foxes, feral cats, European rabbits, feral goats and feral pigs.

Over 95% of all donkeys and mules, but only 60% of all horses, are found in developing countries[21] - primarily in central Asia, and North and East Africa. The distributions are likely a result of the distribution of surplus wealth: donkeys are used for work, horses now for pleasure, and mules for some of each.

IMAGE A: Four-year-old Chester, owned by Deb Gibbs who feels donkeys seem to have an innate ability to sense feelings and reciprocate. Image courtesy Deb Gibbs.

IMAGE B: Mules are famously stubborn, but a closer look leads the author to think humans are famously stubborn. Image source: www.shutterstock.com.

IMAGE C: It is hard to imagine any other animal carrying loads over this stuff. Climbing a pile of loose rocks takes more than a good pair of sneakers. Image source: www.pixabay.com.

Life in a developing country is as hard on an equine as it is on the people living there. One study assessing the welfare of working horses, mules and donkeys found that 70% of the nearly 5,000 animals studied were thin, and over 75% of the animals had limb deformities and gait abnormalities.

Recommendations

If you want to learn more about horses, get a mule.

You won't be able to manhandle your mule and they will force you to move from horse whisperer to horse listener. Once you've learned what they're thinking and can coax them into sharing their day with you, you'll be ready to return to your horse and really treat them right. But, I suspect once you and your mule have come to love each other, you won't have an interest in going back to your horse.

If you do get a mule, be careful in your choice of veterinarian. Mules are not funny-looking horses. There are hundreds of critical differences that may need to be considered to maintain your mule's health, including anatomical differences, respiratory differences, tolerance of medical procedures, drug metabolism, how drugs should be administered, drug response, saddling, diet...[22]

If you are shopping for a mule, consider your weight and that of your prospective equine. If you limit the weight on the back of the equine to 20% of their total weight, a large mule or horse might serve you better than a smaller mule. A mule will never complain about your weight, but might not enjoy it either.

Further reading

If you are interested in the vast differences in internal anatomy between donkey, mule and horse, read Suzanne Burnham's 'Anatomical Differences of the Donkey and Mule'[23i]. For a sideways look at the mule, read 'The Famous Twenty Mule Borax Team from Death Valley California'[24].

List of references:

1. Chandley, A.C. Why do not the mule and hinny look alike? The Mule (Quarterly Journal of the British Mule Society) 43 (1989): 7-10.

2. I am not alone in this thinking. One internet author writes "Where each mule places each foot is critical. He does it from memory. The mule cannot see his feet, but he anticipates where each foot has to go as he moves forward. Horses do the same, but the mule is much better at it." – http://saitosdojo.com/whymul.htm

3. Robinson, Betty. Mules and the Grand Canyon. in Hauer, John (ed.) The Natural Superiority of Mules. The Lyons Press. 2005. p. 49.

4. Grand Canyon National Park. Woman injured in mule accident in Grand Canyon National Park. May 5, 2009. https://www.nps.gov/grca/learn/news/mule-accident.htm

5. Metcalfe, J. Mapping the Grand Canyon's Gruesome Legacy of Death. CityLab. May 16, 2015.https://www.citylab.com/environment/2015/05/mapping-the-grand-canyons-gruesome-legacy-of-death/394040/

6. There are many mansplainers out there who think that mule skinning is the business of taking the skin off a mule with a whip. Today, at least, mule skinners could not earn a living by doing this, and outsmarting a mule seems a more likely way to receive a pay check. The term muleskinner is the same as 'mule skinner' and 'mule-skinner'. Use whatever spelling appears in local use. Or swap in the term 'muleteer'. Or 'mule whisperer'.

7. See https://www.horsesandpeople.com.au/search/node/The%20Equine%20Pain%20Face

8. Ashley, F.H., A.E. Waterman-Pearson, and H. R. Whay. Behavioural assessment of pain in horses and donkeys: application to clinical practice and future studies. Equine veterinary journal 37, no. 6 (2005): 565-575.

9. Seyoum, A., Birhan, G., & Tesfaye, T. (2015). Prevalence of Work Related Wound and Associated Risk Factors in Cart Mules of Adet Town, North-Western Ethiopia. American-Eurasian Journal of Scientific Research, 10(5), 264-271.

10. Burnham, S.L. Anatomical differences of the donkey and mule. In Proceedings, vol. 48, pp. 102-109. 2002.

11. Yousef, M. K. The burro: a new backyard pet? Its physiology and survival. Calif Vet 33 (1979): 31-34.

12. Stephen, J. O., Baptiste, K. E., & Townsend, H. G. (2000). Clinical and pathologic findings in donkeys with hypothermia: 10 cases (1988–1998). Journal of the American veterinary medical association, 216(5), 725-729.

13. One authority, in a section entitled; Mules can stand the heat and cold better than the horse, devotes a couple paragraphs to discussing the better heat tolerance of the mule, but in her only reference to cold tolerance, writes "The reason for their exceptional cold tolerance is yet to be understood." Attar, C. (2009). The Mule Companion: A Guide to Understanding the Mule. CCB Publishing. p. 91.

14. xxixStephen, Jennifer O., Keith E. Baptiste, and Hugh GG Townsend. Clinical and pathologic findings in donkeys with hypothermia: 10 cases (1988–1998). Journal of the American veterinary medical association 216, no. 5 (2000): 725-729.

15. Osthaus, Britta, Leanne Proops, Sarah Long, Nikki Bell, Kristin Hayday, and Faith Burden. Hair coat properties of donkeys, mules and horses in a temperate climate. Equine veterinary journal (2017).

16. Yılmaz, O., Boztepe, S., & Ertuğrul, M. (2012). The domesticated donkey: III. Economic importance, uncommon usages, reproduction traits, genetics, nutrition and health care. Can J App Sci, 3(2), 320-338.

17. See http://leahaven.blogspot.com/2010/08/labor-day-at-leahaven.html

18. Budiansky, S. (1997). The Nature of Horses: Their Evolution. Intelligence and Behaviour, Phoenix.; Jensen, P. (2006). Domestication - from behaviour to genes and back again. Applied animal behaviour science, 97(1), 3-15.

19. Proops, L., Burden, F., & Osthaus, B. (2012). Social relations in a mixed group of mules, ponies and donkeys reflect differences in equid type. Behavioural processes, 90(3), 337-342.

20. Yilmaz, O., Boztepe, S., & Ertuğrul, M. (2012). op.cit.

21. Fielding, D., 1991. The number and distribution of equines in the world. In: Proceedings of the Colloquium on Donkeys, Mules and Horses in Tropical Agricultural Development, Edinburgh, 3–6 September, pp. 62–66.

22. Purdy, Stephen. op.cit.

23. Burnham, Suzanne L. op.cit. Available as a PDF here: http://www.ivis.org/proceedings/AAEP/2002/910102000102.PDF

24. There are a number of publications, new and old, about the Death Valley mules. This citation is to a reprint of The Famous Twenty Mule Borax Team from Death Valley California, produced by the Pacific Coast Borax Co. in 1900. It is available on Amazon.

June Grass Farmers - Vegetation on Horse Properties: Part 2

WORDS BY Jane and Stuart Myers
www.equiculture.net

Horse properties should be biodiverse havens containing many different species of vegetation other than pasture. You should aim to grow herbs, succulents, bushes and trees in as many areas as possible for the huge benefits they provide.

As well as for your horses, this has the added bonus of transforming your horse property into an environmental asset.

In this article, Jane and Stuart Myers explain the benefits, and give practical advice on placement and plant selection.

ABOVE: Biodiverse vegetation on any horse property provides many benefits, and can greatly enrich and improve the environment for all the occupants. These horses can access 'fodder trees' which add variety to their diet. Photo by Linda Zupanc.

Last month, we listed and explained the many benefits that trees and bushes can provide on a horse property, as well as the areas that are easiest to vegetate.

Re-vegetating also offers horse property owners the chance to benefit the environment by providing habitat for wildlife. In Australia, trees and bushes are habitat for numerous species of insects, mammals, marsupials and birds.

Any existing wildlife on the property needs to be protected and habitat created for different species. The more varied the ecosystem, the more sustainable the property will be.

Creating wildlife habitat does not have to be at the expense of grazing land, as maintaining and creating habitat for wildlife provides numerous benefits to the property, such as:

- Pest control (see last month's article).
- Species of native beetles, spiders, centipedes, bees and other insects that have an ecological niche and play an important role in maintaining a healthy ecosystem.
- Certain small mammals and marsupials eat insects, including those that damage plants.
- Small, insectivorous bats also eat many insects, such as mosquitoes, by the thousands on a daily basis.

To encourage and protect these beneficial creatures you can fence off areas of existing native vegetation or create new areas. Make sure the fencing allows native animals to pass through and, where possible, link these areas to others, both on the property and in neighbouring properties to create 'wildlife corridors'.

Find out which birds and other beneficial animals or insects migrate to or live permanently in your area, and encourage them by planting trees and bushes that attract them.

Old, hollow logs should be left alone, as native animals rely on them for habitat. In fact, you may need to look at providing man-made habitat if there are no natural examples around, as it takes many years for these to develop.

Some birds rely on old trees that have hollows where they can nest. Rocks provide habitat for frogs. Speak to your local land/soil conservation group for some advice.

> Trees and bushes generally improve the environment in many ways. They reduce evaporation from the soil, enabling the plants to utilise the moisture more effectively and increasing growth periods and, therefore, yield. They also reduce wind-driven erosion on dry soils.

Fodder trees

There is a growing interest in feeding domestic animals with fodder trees because of the success in countries with harsh conditions, especially desert terrain.

Most fodder trees share certain characteristics such as:

- They have long roots, so they can access water from deep below the surface and, therefore, provide fodder, even in very dry conditions.
- Many fodder trees provide more feed than pasture per square metre of land.
- Many are legumes. They fix nitrogen in the soil, reducing the need for nitrogenous fertiliser.
- Many have high protein yields.
- Many fodder trees are also good windbreak and fire-resistant trees.
- They can have healthy benefits - many of which are currently being researched.

When sourcing fodder trees, opt for local, native trees whenever possible. You also need to take into account your climate and soil conditions.

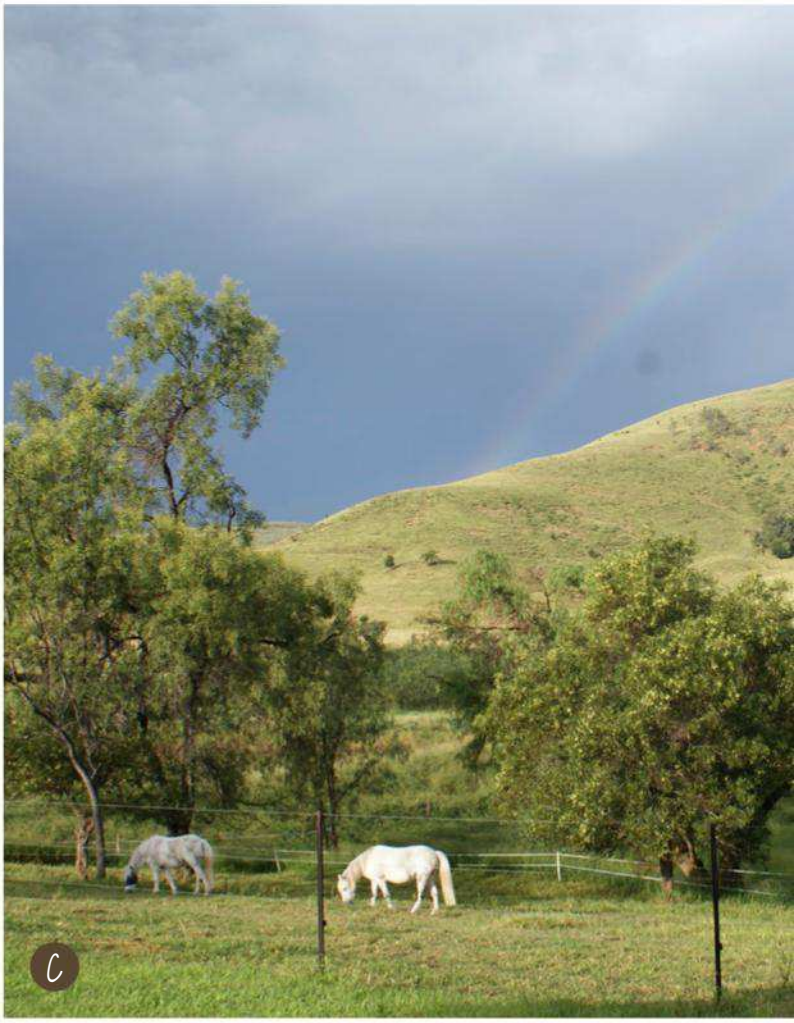


IMAGE A: Standing under trees can lead to compaction and damage of their root system. A great advantage of a functioning Equicentral System is horses will tend to use the shelter in the surfaced holding yard and reduce pressure on the soil in all your precious pasture areas. Photo by Linda Zupanc.

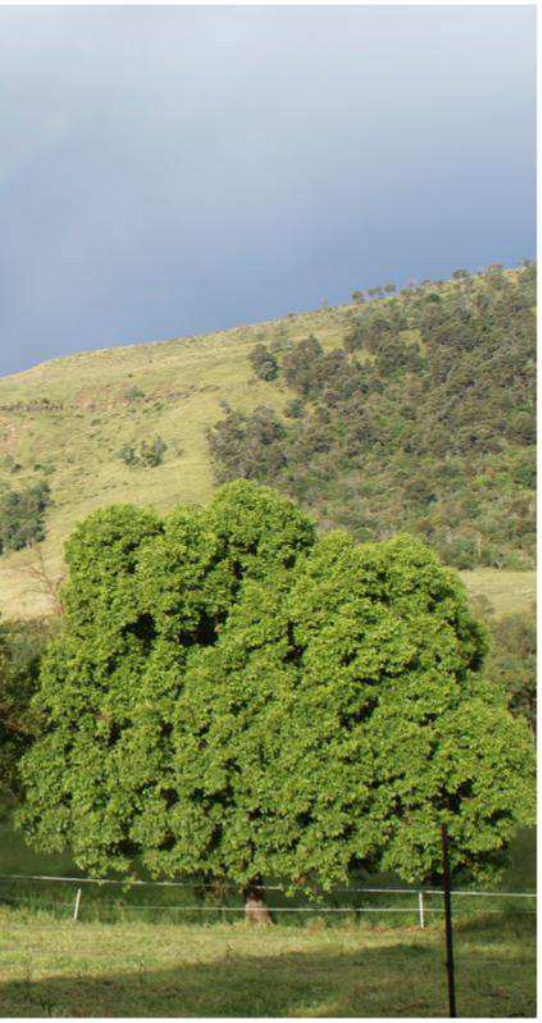
IMAGE B: Fodder trees can have healthy benefits, all of which are currently being researched. Photo by Linda Zupanc.

IMAGE C: Trees and bushes need protection from horses and grazing animals if they are to survive and thrive. Fencing is expensive and this is why it's always best to avoid planting within paddocks. Photo by Cristina Wilkins.

Easy areas to vegetate

Concentrate on developing any new plantation in the following areas, rather than in the middle of paddocks (with the exception of steep areas within a paddock, which are appropriate, but will require protection from grazing animals).

- The corners of paddocks,
- The perimeter of the property,
- Between paddocks,
- As an addition to a shelter,
- In laneways and driveways,
- Along contours and swales,
- In wet areas of land,
- Around waterways, and
- On steep sections within paddocks.



Aim for no more than 2m in height, so both you and your animals can reach them. They also need to be accessed from both sides, so don't plant them as boundary plants. Internal lane ways/ driveways and corners of paddocks are best for these plants.

They can be planted around a surfaced training yard and on the outside of surfaced holding yards. You may want to plant them as an orchard of trees and allow the horses in for periods of grazing.

Whenever you plant fodder trees, a variety of species is a good idea so the horses can browse as they would naturally. The plants need to be alternately grazed and rested in just the same way that pasture does. They will need to be fenced off from stock for at least the first year after planting (maybe longer), so they can become established.

Please check with your local authorities before planting to ensure it is not declared a weed in your area!

Tips for buying and planting

Once you have identified the trees and bushes you want, you will need to find a good supplier. If you are vegetating or re-vegetating the property bit by bit, it may be possible to get what you need on an ad hoc basis, looking for good buys at nurseries and markets, even auctions.

If you are planning to buy in bulk, you may find your local council has a nursery. Your local land/soil conservation group is another excellent contact. It may even be possible to get subsidies or free trees, particularly if it involves a waterway.

Make sure the trees and bushes are not poisonous to horses, and ensure you buy healthy specimens.

Tube stock are usually much cheaper to buy and they have a high success rate if they are purchased at the right time (before they outgrow the tube).

Tubes allow the roots to grow in the correct way for plant development. They are also very good for buying in bulk.

Plan your purchases well in advance, so you can take advantage of the ideal time to plant, instead of having to wait for stock to be ordered.

By planting trees and bushes in the areas listed in the text box on the opposite page, you will find it is easy to achieve a state where 30% of the property is vegetated with trees and plants other than grass.

(For more tips, see last month's article.)

Preparing the planting area

Compacted soil may need to be ripped by a tractor with a ripper, so young roots can infiltrate the soil.

Plants grown in waterlogged soil may need mounds around them to prevent from drowning.

Weeds will need to be controlled before new plants are planted. Once your new plants are in the ground, mulching will help control weeds further.

Aim to keep a 1m radius clear of grass and other vegetation around your new plant for, at least, the first year.

Aim to plant at the best time of year for your locality.

Speak to local experts long before you spend money and time preparing the land, buying and planting new vegetation. This will help avoid unnecessary and often expensive disappointments.

Protecting vegetation from horses

Trees and bushes need protection if they are to survive and thrive. Even fodder trees need a break and will die out if the browsing of them is not controlled.

Here are some of the various forms of 'abuse' that horses and other grazing animals can inflict on vegetation:

- Compaction of the roots by standing at the base of the tree (i.e. using it for shade).
- Chewing the bark and, eventually, 'ring barking' a tree (where all the bark is removed right around the trunk). This leads to the death of the tree.
- Eating/trampling young trees and bushes entirely. The plant may not recover, depending on the species.
- Using trees and bushes as a rubbing post. This can cause the tree/plant to snap and possibly die.

Protecting trees

This can be done in many ways, including fencing, wrapping, mulching and using tree savers. What you need will vary depending on the situation of the trees and bushes.

EQUICULTURE ANNOUNCEMENT:

The 21st Century Horse Management Course is Now Available!

Much more than a course, it's a resource... The biggest resource of its type in the world.

What is this course about?

It's about managing horses in the best way possible - creating healthy pasture by looking after the land and their environment. It's a win-win situation.

Learn how to improve the health and wellbeing of your horses, plus save time, energy and money. People have saved thousands of dollars by making simple changes.

The course teaches you how to minimise and usually eradicate mud, dust and weeds. It explains how, by understanding horse behaviour, these problems can be be eliminated.

What does this mean to you?

- You save time, money and effort, your land becomes healthier and more producive, and your horses become healthier, both physically and mentally.
- You can prevent or reverse the damage to your land!
- You can learn how to provide safer pasture!
- You can become a knowledgeable, responsible horse and land manager!
- You can improve the 'lifestyle' of your horses, as well as your own!

What do you get?

Lifetime access to 12 information packed modules, containing articles and videos written and produced by Equiculture and international experts from around the world. It already has more than 150 lessons. These lessons will continue to be added to.

Case studies, features and stories from horse owners and horse business owners already following better horse management practices.

Each module has a huge amount of easily understood information, all founded upon scientific evidence, but available in easy to understand, bite-sized chunks. Each module builds on the last.

Who is this course for?

For experienced horse people and inexperienced horse people alike. Everyone will get lots out of it because this is a new way of looking at horse management.

Responsible horse keeping that blends the best of the past, present and future.

Find out more at: https://bit.ly/2IWv3rs

Single trees and groups (copses) of trees within paddocks give a property a 'park like' look. Vegetation in the middle of a paddock provides shade at all times of the day and, if you have very large paddocks, then a few copses of trees may be of benefit.

Grouped trees tend to be healthier than single trees, as trees rely on each other in many ways. Any gaps between the trees can be allowed to revegetate or be planted with species that you particularly want on the property, such as bird-attracting trees.

However, unless they are already established, it's best to avoid new plantings within a paddock. This is because:

- Trees in a paddock make it harder to work in or maintain the pasture (for example, harrowing or slashing).
- If you are planning on setting up an Equicentral system, you will want to encourage your horses to use your shelter, rather than trees, for shade.
- Fencing is very expensive and, in order to be effective, it should be out as far as the drip line (the circumference of the canopy).

If they already exist, then by all means nurture them by protecting them from horses. If you are using electric fencing, this can be more complicated because the electricity will need to be taken underground, out to the area within the paddock, via an insulated carrier.

Protecting from ring barking

Any unfenced trees within a paddock needs to be monitored for signs of chewing and ring barking. If your horses start to chew the trees, there are several things you should think about:

Check there's enough suitable pasture in the paddock. The main reason horses chew trees is because they are not ingesting enough fibre.

This could be due to overgrazing, over stocking, drought, etc. In this case, horses need supplementary feed - particularly fibrous hay.

Top Tip

Regardless of the property size, a good figure to aim for is 30% of a given area of land to be vegetated with trees, bushes and other beneficial plants.

Horses can also crave fibre when pasture is growing rapidly. In this case, it actually has a very high water content - as much as 80 to 90%. Again, the horses need supplementing with hay.

In both the above scenarios, it is best to remove the horses for all or part of each day, and feed hay in a surfaced holding yards (For more information, read this article online: **https://bit.ly/2KrmF3R**, which appeared in the July 2017 issue).

If the trees cannot be protected with fencing, you may need to wrap the trunks in mesh or other material, but keep in mind this practice may impact on any local wildlife that climbs trees.

Protecting the base of trees

Mulch placed around the base of a plant (but not touching the stem or trunk) will help to regulate temperature extremes. Mulch that touches the base of the plant may cause the stem to rot.

Mulch suppresses weeds, acts as a slow release fertiliser for plants (depending on the mulch type), provides an environment for plant-friendly insects and reduces water evaporation.

Be generous with the mulch and pile it higher on the outside than the inner rim.

Mulch materials can be lawn clippings - provided the horses cannot access these! Paper, straw/hay and wood chips also work. In fact, any organic matter will make mulch, with some being better options than others.

Grass clippings are best mixed with coarser material, such as twigs and leaves, as they tend to clump.

Fresh manure should not be used as it can be too 'strong'. Also, when it dries, it can form a surface that repels water.

Composted manure should be regarded as a fertiliser and covered with mulch, so it does not dry out.

Newspaper, cardboard or carpet placed under another form of mulch will further reduce evaporation by approximately 70%, and it also provides shelter to beneficial soil insects and earthworms.

A common form of mulch is bark mulch. Tree prunings are often readily available from businesses that advertise tree lopping/tree care as they are a by-product. Your local council may have mulch to sell cheaply or even give away. Your local refuse tip may also sell or give away mulch that is made from suitable green waste.

If mulch contains garden waste, make sure your horses do not have access to it, because it could easily contain poisonous plant material.

Any trees that horses use to stand under on a regular basis may need to be mulched to protect the roots from compaction caused by hooves.

Protecting young plants

Young trees and bushes need protecting from rabbits, native animals, horses and other grazers. A plastic or cardboard 'tree saver' around each will protect them from smaller animals and has a 'greenhouse' effect, but will not protect them from horses or cattle, because they can access the plant from the top.

Protecting bush land

Bush and woodland can be sensitive, and must be fenced off from domestic grazing animals to protect it.

These areas usually provide little or no grazing anyway, so there is often no point in using them for paddocks. Even if they do have good pasture in them, fencing them off will allow you to control the amount of grazing pressure they receive. If they are left as part of a paddock, they will always be available and will be overused. It is important to control grazing in these areas.

Established bush land, in particular, needs to be protected from the horses. On a horse property, these areas are usually considered a nuisance and earmarked for clearing (legally or illegally), but they should be seen as a valuable asset!

Remember, you should be aiming for biodiversity on your property.

Any fencing of bush land should be constructed so native animals can still pass through. Wherever possible, these areas should link with other tall vegetation areas both on the property and outside the property, such as neighbours, forests and conservation areas, as 'wildlife corridors'.

Leave fallen trees in these areas if it is safe to do so, as they provide good habitat for wildlife. Your local environmental protection group should be able to help with advice about these areas and, in some localities, financial help may also be available.

Protecting from weeds

Weeds that grow amongst existing or newly established plantings need to be tackled promptly. These areas tend to get forgotten about when it comes to weed control because they are usually unproductive in terms of providing pasture but, as well as causing problems for wildlife and wild (native) plants, noxious weeds will also infest the pastures, so it is far better to curb them before they get out of hand.

ABOVE: Plastic guards can protect young trees and provide a 'greenhouse' environment; generous mulching will keep weeds at bay and prevent up to 70% evaporation. Photo by Cristina Wilkins.

Creating wildlife habitat does not have to be at the expense of grazing land. In actual fact, maintaining and creating habitat for wildlife provides numerous benefits to any horse property.

What about poisonous trees?

It is not always easy to identify which plants are harmful to horses. Fortunately, horses are selective when grazing and innately avoid eating plants they are not sure about.

Possibly the largest factor that leads to domestic horses eating poisonous plants is poor pasture management. If a horse does not have enough of the right kinds of plants to choose from, they will turn to eating plants they would normally avoid.

In order to minimise the risk:

- Learn to recognise plants in your local area that are known to be poisonous and be suspicious of unfamiliar plants to which horses might have access.
- Find out how such plants can be managed or removed.
- Recognise the conditions when certain plants are at their most dangerous.
- Do not allow horses to have access to garden waste or poisonous trees near fence lines.
- Seek veterinary advice if you suspect posioning.

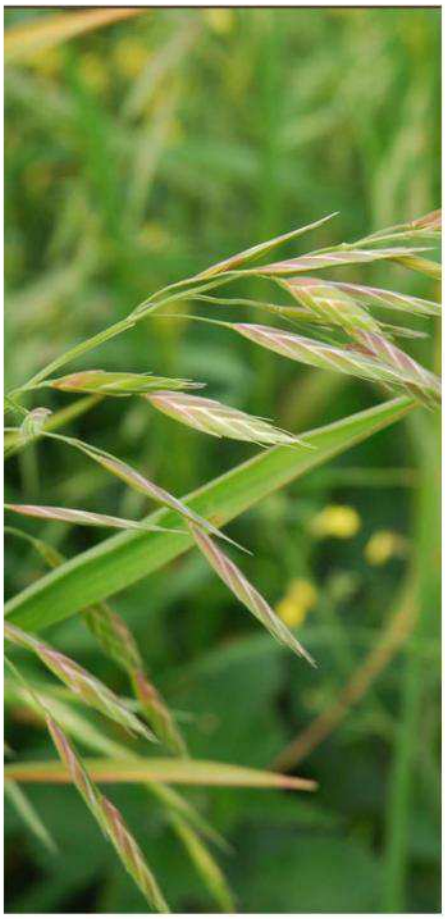
For more inspiration, to share your experiences with vegetation or ask other people for practical advice, join the ongoing discussions on the Facebook group 'Equicentral Central' at: **https://www.facebook.com/groups/1675132882738247/**

Plant of the Month: Prairie Grass

Bromus wildenowii

Indigenous to South America, prairie grass is one of the perennial brome grasses introduced as a pasture species, because it is very palatable and grows well in cooler times of the year. Prairie grass is now widespread in temperate Australia.

Prairie grass is very acceptable to horses. It performs well on very fertile soils under favourable growing and moisture conditions. Prairie grass will not persist under dry conditions and doesn't tolerate waterlogged conditions.



Some perennial brome grasses have a longer growing season than others and tend to go to seed later than the naturalised strain of prairie grass, which starts seeding in August and September.

Perennial brome grasses are densely tufted and relatively shallow-rooted. Appearance differs slightly between species. Prairie grass is the most robust type, with broader leaves (up to 10mm wide and 30cm long) and a more upright growth habit.

They require well-managed rotational grazing. Young plants should not be grazed too early and, in order to maintain pasture density, they have to be allowed to set sufficient seed.

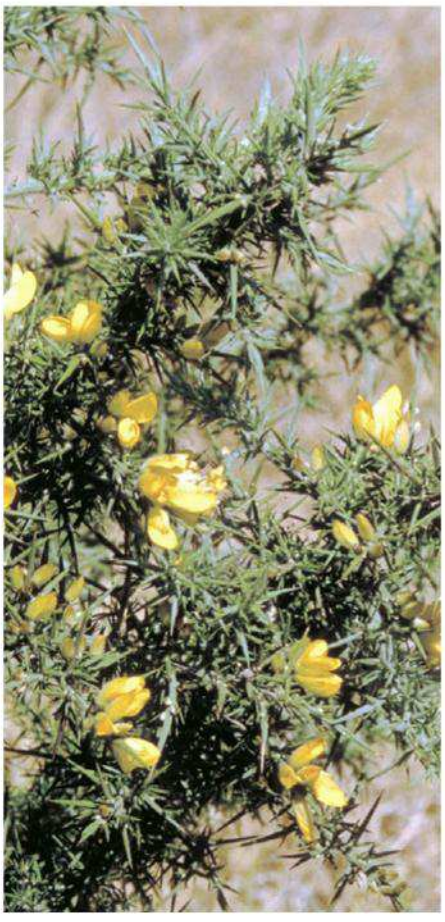
Weed of the Month: Gorse

Ulex europaeus

Gorse is a Weed of National Significance in Australia, which affects temperate areas. It spreads easily, provides shelter for rabbits, is very flammable and reduces stocking rates dramatically.

Gorse is a prickly, perennial, evergreen legume that, undisturbed, can grow up to 3m. It has deep and extensive roots.

The seeds can remain dormant in the soil for up to 30 years!



The small, waxy leaves and robust root system enables it to thrive in areas with very low rainfall. The early and profuse flowering, however, could be an important source of pollen for beekeepers.

Prevention is the most cost-effective means of controlling gorse.

Where it exists, success relies on a combination of methods, such as herbicide (when plants are actively growing, but not flowering), mechanical control (using dozers and ripping), burning dense thickets (before grazing or before spraying), and biological control agents (which are being developed to reduce its vigour). Goats are also very good at controlling gorse, but it will grow back if they are removed.

Any control program is long-term, because of the large quantities of seeds in the soil.

Find out more at: https://bit.ly/2rLdP9n

All About Soil Part 4: Test Results

WORDS BY Mariette van den Berg
BAppSc (Hons), PhD (Equine Nutrition), RAnNutr
Certified Equine Permaculture Design Consultant

In this exclusive Equine Permaculture series, we have been 'digging deeper into soils' and explored what soils are, how soil is formed, the different types of soil and how they sustain life through the soil-food-web.

In Part Three (see Horses and People April 2018 issue), we described soil sampling and started to investigate some important parameters of soil health using DIY techniques. In this Part Four, we will continue with soil laboratory tests and how to interpret these results.

You can use soil tests as a diagnostic tool or to identify trends through time, which can help you in your decision-making process on how to improve your soils and, ultimately, enhance your pasture health.

Soil laboratory testing

The primary goal of soil testing is to inform efficient and effective resource management on your property. Soil testing is the most accurate way to determine the current state of your soils, its composition, what nutrients it may need (or that are in excess) and other characteristics, such as pH and salinity. Soil testing is also useful for identifying contaminated sites (e.g. elevated levels of heavy metals, pesticides, etc.).

Once you have collected your soil samples (see Part Three in Horses and People April 2018 issue), you will have to send these to a soil-testing laboratory to have them accurately analysed.

LEFT: Photo by Linda Zupanc.

Table 1. Plant-available nutrient forms.

Nutrient	Form used by plant
Cations (+):	
Nitrogen	NH^{4+}
Potassium	K^{+}
Calcium	Ca^{2+}
Magnesium	Mg^{2+}
Manganese	Mn^{2+}
Copper	Cu^{2+}
Zinc	Zn^{2+}
Anions (-):	
Nitrogen	NO_3^-
Phosphorus	$H_2PO_4^-$ and HPO_4^{2-}
Sulfur	SO_4^{2-}
Boron	H_3BO_3 and $H_2BO_3^-$
Molybdenum	$HM_oO_4^-$ and $M_oO_4^{2-}$
Chloride	Cl^-

Roots take up plant-available nutrients as positively (cations) or negatively (anions) charged ions from the soil (see Image B) with the help of structural elements, such as carbon (C), hydrogen (H) and oxygen (O). So, when you see your soil tests results, keep in mind nutrients are expressed as plant-available or extractable/exchangeable.

It is important to recognise the values obtained when a soil sample is analysed are of little use as raw analytical data. In order to make use of the values in predicting nutrient needs, the test must be calibrated.

These calibrations are based on nutrient response research with representative soils (and conditions) - ranging from deficient to adequate for each nutrient of concern. These calibrations are also plant/crop or soil-specific. The sufficiency/optimal range (or typical range, in some cases) is usually provided in the column to the right of your results (for quick comparison).

Soil testing laboratory methods vary, which may influence results and sufficiency ranges. This means if you send the same soil sample to two or three different labs, you may see some variation in the results, as this is largely determined by the analysis techniques and calibrations used at that lab, and may be specific to a region (i.e. state).

Therefore, it is important to check lab techniques/methods used and if the lab is accredited by an authority, such as NATA (National Association of Testing Authorities) or ASPAC (Australian Soil and Plant Analysis Council).

There are other national and international accreditation systems. By visiting the lab's website, you can find most of this information, as well as their pricing!

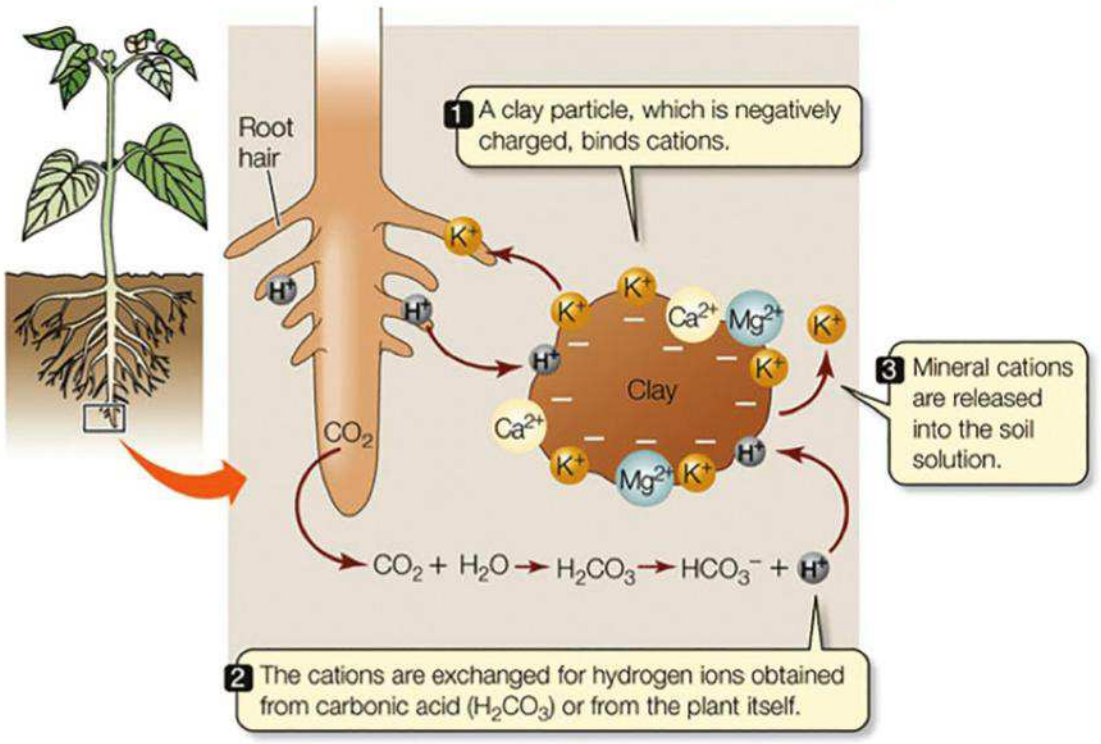
Interpreting results

You finally received your soil report of your soil samples, but what does it tell you and how should you interpret these results to make an informed decision?

As mentioned earlier, there are different parameters we can measure in soil and the selection of these listed parameters is determined by the soil analysis packages that you chose when you submitted your samples. Some of these parameters are reasonably simple, such as identifying soil type, which you may already have done yourself by following the instructions outlined in Part Three in the last issue.

When it comes to the nutrients, it is important to note soil tests measure nutrients that are expected to become plant-available, rather than the total amounts of nutrients in soil. Measurements of total nutrient content are not useful indicators of sufficiency for plant growth, because only a small portion of the nutrients in the soil are plant-available.

B



LIFE 8e, Figure 36.6

LIFE: THE SCIENCE OF BIOLOGY, Eighth Edition © 2007 Sinauer Associates, Inc. and W. H. Freeman & Co.

Roots take up plant-available nutrients as positively (cations) or negatively (anions) charged ions from the soil (see Image B) with the help of structural elements, such as carbon (C), hydrogen (H) and oxygen (O). So, when you see your soil tests results, keep in mind nutrients are expressed as plant-available or extractable/exchangeable (using various test methods, such as Merlich, Morgan, Bray, Olsen, DTPA, etc.). These testing methods will typically be listed in your results as reference.

It is also important to recognise soil test results can be viewed in three categories:

- Low or yes, a fertiliser addition will likely increase growth and productivity;
- High or no, a fertiliser addition will not likely increase growth or yield;
- Intermediate or maybe, a fertiliser addition may increase growth or productivity.

This categorisation is based on the sufficiency/optimal level range, and is often displayed per soil types or can be presented in a bar figure for selected soil type (see Image D on the next page).

Categorisation of soil test results into 'yes (low), 'no' (high) and 'maybe' (medium) assists us in understanding the limits and benefits of using soil test results for making nutrient and soil management recommendations. This will be discussed in more detail in the last part of this series in a future issue!

Let's now look at the different nutrients and other soil characteristics that are listed on your report, and discuss what they tell you. Please note, your results may be expressed in different measuring units, such as parts per million (ppm) or m/kg (which is the same 1:1 for soil).

Soil type

Soil type is reported as the colour and texture of the soil. Both colour and texture are indicators of properties of the soil, and are taken into account when interpreting other soil chemical results, such as Cation Exchange Capacity (CEC).

C

IMAGE A: Soil test results can be helpful when making pasture management decisions. Photo by Sophie Barrington.

IMAGE B: Roots take up plant-available nutrients as positively (cations) or negatively (anions) charged ions from the soil. Image source: 'Life: The Science of Biology', English edition.

IMAGE C: Values obtained by analysis must be calibrated according to the plant/crop, soils and conditions. Image source www.shutterstock.com.

A

B

C

D

DATE: 22/12/2016
NAME: J Smith
ADDRESS: c/- Batphone Australia P/L
PO Box 54
GEEBUNG QLD 4034

LAND USE: Turf
PADDOCK: #1 Main
SAMPLE REC: 20/12/2016
E-MAIL: info@batphone.cc

PLANT of HEALTH

ALBRECHT CATEGORY	YOUR LEVEL	IDEAL LEVEL	NUTRIENT STATUS LOW / MEDIUM / HIGH
CEC	9.59		
TEC	12.62		
Paramagnetism	166	200 +	
pH-level (1:5 water)	5.70	6.3	
Organic Matter (IR Gas Anal.)	3.22 %	4 - 10 %	
Conductivity (1:5 water)	0.2 mS/cm	0.1 - 0.2 mS/cm	
Ca / Mg Ratio	4.64 :1	5.67 :1	
Nitrate-N (Morgan)	40.1 ppm	10 - 20 ppm	
Ammonium-N (Morgan)	3.7 ppm	10 - 20 ppm	
Phosphorus (Mehlich III)	166 ppm	50 - 70 ppm	
Calcium (Mehlich III)	1361 ppm	1716 ppm	
Magnesium (Mehlich III)	176 ppm	182 ppm	
Potassium (Mehlich III)	360 ppm	148 - 246 ppm	
Sodium (Mehlich III)	73 ppm	15 - 44 ppm	
Sulphur (Morgan)	59 ppm	30 - 50 ppm	
Aluminium (Mehlich III)	7.0 ppm	< 6 ppm	
Silicon ($CaCl_2$)	30 ppm	> 100 ppm	
Boron (Hot $CaCl_2$)	0.49 ppm	1 - 3 ppm	
Iron (DTPA)	255 ppm	40 - 200 ppm	
Manganese (DTPA)	8 ppm	30 - 100 ppm	
Copper (DTPA)	1.4 ppm	2 - 7 ppm	
Zinc (DTPA)	13.7 ppm	5 - 10 ppm	
Molybdenum (TAE)	N/A	0.5 - 2 ppm	
Cobalt (TAE)	N/A	2 - 40 ppm	
Selenium (TAE)	N/A	0.6 - 2 ppm	
Texture	Loam		
Colour	Brownsih		
BASE SATURATION (Levels are not really relevant in soils with a TEC below 5)			
Calcium	53.93 %	68.00 %	
Magnesium	11.62 %	12.00 %	
Potassium	7.32 %	3.00 - 5.00 %	
Sodium	2.52 %	0.50 - 1.50 %	
Aluminium	0.62 %	0.50 %	
Hydrogen	24.00 %	10.00 %	
LAMOTTE/REAMS CATEGORY	**YOUR LEVEL**	**IDEAL LEVEL**	**NUTRIENT STATUS LOW / MEDIUM / HIGH**
Calcium	883.3 ppm	1000 - 2000 ppm	
Magnesium	130.9 ppm	140 - 285 ppm	
Phosphorus	17.17 ppm	20 - 80 ppm	
Potassium	212.8 ppm	80 - 100 ppm	

Explanatory Notes: The La Motte test gives an indication of the amount of plant available nutrients at the time of sampling.

ROUTINE AGRICULTURAL SOIL ANALYSIS REPO

Job No:	G4973
No of Samples:	4
Date Supplied:	15th November 2017
Supplied by:	MB Equine Services

Method	*Nutrient*	
Morgan 1	Calcium	Ca
	Magnesium	Mg
	Potassium	K
	Phosphorus	P
Bray1 Colwell Bray2	Phosphorus	P
KCl	Nitrate Nitrogen	N
	Ammonium Nitrogen	
	Sulfur	S
1:5 Water	pH	
	Conductivity	
Calculation	Estimated Organic Matter	
Ammonium Acetate + Calculations	Calcium	Ca
	Magnesium	Mg
	Potassium	K
	Sodium	Na
KCl	Aluminium	Al
Acidity Titration	Hydrogen	H^+
Calculation	Effective Cation Exchange Capacity (ECEC)	
Base Saturation Calculations	Calcium	Ca
	Magnesium	Mg
	Potassium	K
	Sodium - ESP	Na
	Aluminium	Al
	Hydrogen	H^+
Calculation	Calcium / Magnesium Ratio	
DTPA	Zinc	Zn
	Manganese	Mn
	Iron	Fe
	Copper	Cu
$CaCl_2$	Boron	B
	Silicon	Si
LECO IR Analyser	Total Carbon	C
	Total Nitrogen	N
Calculation	Carbon/ Nitrogen Ratio	
	Basic Texture	
	Basic Colour	
Calculation	Chloride Estimate	

Soil colour

Soil colour has little direct influence on its chemical, physical or biological attributes, but when considered with other observations, can be very useful.

Often, soils of darker colour are higher in organic matter than lighter coloured soils. Red colour can be related to un-hydrated iron oxides present in well drained soils; yellow or mottled coloured soils may be related to hydrated iron oxides, which may occur where soils are saturated for long periods and/or poorly drained.

The Munsell Soil Colour Charts are internationally accepted as being the standard guide to discern soil colour classification. You can view it online at: **https://bit.ly/2HPfNNu**.

)RT

Sample ID:	Sample 1 A - FP1	Sample 2 B - FP2	Heavy Soil	Medium Soil	Light Soil	Sandy Soil
Crop:	n/g	n/g				
Client:	Drapac	Drapac	e.g Clay	e.g Clay Loam	e.g Loam	e.g Loamy Sand
Units	G4973/1	G4973/2	Indicative guidelines only- refer Note 6			
mg/kg	482	447	1150	750	375	175
	152	128	160	105	60	25
	89	84	113	75	60	50
	2.6	2.0	15	12	10	5.0
mg/kg	17	12	45 note 8	30 note 8	24 note 8	20 note 8
	70	41	80	50	45	35
	38	23	90 note 8	60 note 8	48 note 8	40 note 8
mg/kg	2.4	2.0	15	13	10	10
	2.6	2.0	20	18	15	12
	4.8	4.2	10.0	8.0	8.0	7.0
units	5.76	5.84	6.5	6.5	6.3	6.3
dS/m	0.040	0.028	0.200	0.150	0.120	0.100
% OM	5.3	3.8	>5.5	>4.5	>3.5	>2.5
cmol+/Kg	4.64	4.20	15.6	10.8	5.0	1.9
kg/ha	2083	1884	7000	4816	2240	840
mg/kg	930	841	3125	2150	1000	375
cmol+/Kg	1.88	1.59	2.4	1.7	1.2	0.60
kg/ha	511	433	650	448	325	168
mg/kg	228	193	290	200	145	75
cmol+/Kg	0.58	0.44	0.60	0.50	0.40	0.30
kg/ha	511	385	526	426	336	224
mg/kg	228	172	235	190	150	100
cmol+/Kg	0.13	0.12	0.3	0.26	0.22	0.11
kg/ha	68	60	155	134	113	57
mg/kg	30	27	69	60	51	25
cmol+/Kg	0.15	0.14	0.6	0.5	0.4	0.2
kg/ha	29	29	121	101	73	30
mg/kg	13	13	54	45	32	14
cmol+/Kg	0.16	0.13	0.6	0.5	0.4	0.2
kg/ha	4	3	13	11	8	3
mg/kg	2	1	6	5	4	2
cmol+/Kg	7.54	6.61	20.1	14.3	7.8	3.3
%	61.6	63.4	77.6	75.7	65.6	57.4
	24.9	24.0	11.9	11.9	15.7	18.1
	7.7	6.6	3.0	3.5	5.2	9.1
	1.7	1.8	1.5	1.8	2.9	3.3
	1.9	2.1	6.0	7.1	10.5	12.1
	2.2	2.0				
ratio	2.5	2.6	6.5	6.4	4.2	3.2
mg/kg	3.0	1.9	6.0	5.0	4.0	3.0
	42	25	25	22	18	15
	414	258	25	22	18	15
	0.7	0.8	2.4	2.0	1.6	1.2
mg/kg	0.42	0.44	2.0	1.7	1.4	1.0
	34	32	50	45	40	35
%	3.00	2.15	>3.1	>2.6	>2.0	>1.4
%	0.25	0.17	>0.30	>0.25	>0.20	>0.15
ratio	12.0	12.5	10-12	10-12	10-12	10-12
	Loam Brownish	Loam Brownish	.. ..	.. ..	.. ..	.. ..
equiv. ppm	25	18	..	..	..	..

Soil texture

The texture of a soil is an indication of soil type and its properties. It is always taken into account when interpreting the other results and preparing fertiliser recommendations due to leakage issues. Soil texture is measured separately for Mineral Soils and for Organic Soils; for example, peat.

Soil texture can be measured in two ways, including:

- Field method: Where a small handful of moistened soil is squeezed between the thumb and forefinger to produce a ribbon. The length of the ribbon before breaking and the 'feel' of the soil (sandy, silky, etc.) provide an indication of the texture. To improve consistency of results, this test is usually done by experienced laboratory technicians. However, the method remains subjective and the results may differ slightly between assessors. Slight variations are of no real concern to the final fertiliser recommendations.
- Mechanical method: A mechanical sieving process is used to separate and quantify the percentages of sand, silt and clay in a soil. This method is more time-consuming and expensive than the field method, so it is used where greater accuracy is required (e.g. for research).

IMAGES A, B & C: Soil colour has little direct influence on its chemical, physical or biological attributes, but when considered with other observations, can be very useful. Images source: www.shutterstock.com.

IMAGES D & E: Soil testing laboratory methods vary, which may influence results and sufficiency ranges. It is important to check lab techniques/methods used and if the lab is accredited by an authority, such as NATA (National Association of Testing Authorities) or ASPAC (Australian Soil and Plant Analysis Council).

> Soil organic matter assists in maintaining soil structure, and the supply and retention of nutrients, air and water. When monitored for several years, it gives an indication whether soil quality is improving or degrading.

Organic carbon

Soil organic matter (OM) is a surrogate for soil carbon and is measured as a reflection of overall soil health. Organic matter results from partly decayed plant and animal residues in various degrees of decomposition in the soil.

Soil organic matter assists in maintaining soil structure, and the supply and retention of nutrients, air and water. When monitored for several years, it gives an indication whether soil quality is improving or degrading.

Soil OM is important to a wide variety of soil chemical, physical and biological properties. As soil OM increases, so does CEC, total nitrogen (N) content and other soil properties, such as water-holding capacity and microbiological activity. If a soil is low in organic matter, the soil test will result in a low organic carbon level. Preferred levels are above 2%.

Soil pH

Soil pH is a measure of the alkalinity or acidity of the soil. A pH value of 7 is neutral. Values below 7 are defined as acidic and those above are alkaline. The soil pH can influence the availability of nutrients to plants, and potential toxicity of aluminium and hydrogen.

In most Australian soil tests, the pH of the soil is measured in water (pH(water)) or calcium chloride (pH $CaCl_2$). Soil pH $CaCl_2$ values are usually between 0.5 to 1.1 units lower than pH(water). The pH(water) value readily reflects current soil conditions, but is subject to seasonal variations. The $CaCl_2$ test is useful for long-term monitoring of pH and is less subject to seasonal variations. Aim to keep the pH level above 5.3 (water) or 4.5 ($CaCl_2$).

Table 2. Organic carbon percentages (%) over a range of conditions

Organic Carbon Levels	Pastures: Low rainfall	Pastures: High rainfall
Low	Below 1.9	Above 3.1
Normal	Between 1.9 and 2.8	Between 3.1 and 6.2
High	Below 2.8	Above 6.2

Table 3. Ranges of Olsen & Bray Phosphorus (P) and their availability to plants

Olsen P (mg/kg)	Availability	Bray P (mg/kg)	Vary with land use
Below 9	Low*	15-20	Dryland pastures
9 to 14	Marginal	25-30	Irrigated & improved pasture
14 to 20	Adequate	30-50	Tree crops
20 to 27	Elevated	50+	Vegetable
Above 27	Very high		

*(except native pastures)

Soil pH is a measure of the alkalinity or acidity of the soil. A pH value of 7 is neutral. Values below 7 are defined as acidic and those above are alkaline. The soil pH can influence the availability of nutrients to plants, and potential toxicity of aluminium and hydrogen.

Plant-available nitrogen

It is difficult to measure the amount of nitrogen (N) available for plant growth in soils, because the form and availability of nitrogen in the soil can change quickly, particularly in improved pastures. Therefore, by the time the soil samples are received and analysed by the laboratory, the amount of mineral N in the sample may have changed.

Even if the amount of mineral N is correctly analysed by the laboratory, by the time the soil test results are returned to the farmer, changes may have already occurred in the N content of the soil.

The plant-available forms of nitrogen are ammonium-N (NH4-N) and nitrate-N (NO3-N). The abbreviation NH4-N means nitrogen in the ammonium form and the abbreviation NO3-N means nitrogen in the nitrate form.

Soil concentrations of NO3-N and NH4-N depend on biological activity and, therefore, fluctuate with changes in conditions, such as temperature and moisture. Nitrate is easily leached from the soil following high rainfall or excessive irrigation.

Soil tests can determine NO3-N and NH4-N concentrations at the time of sampling, but do not necessarily reflect future conditions.

Available phosphorus

Phosphorus (P) is essential for plant growth and is vital for early root formation. Soil minerals can react strongly with applied phosphorus and only a small proportion may be available for plant uptake.

Plant-available phosphorus can be tested using different methods, such Olsen, Bray or Colwell (depending on the region), and results are presented in milligrams per kilogram (or mg/kg) or parts per million (or ppm).

Available potassium

Potassium (K) is needed for a wide range of important processes within the plant, including cell wall development, flowering and seed set. Available potassium can be measured by different methods, such as Exchangeable K soil tests. Because the holding and supply capacity of potassium in soils can differ,

Photo by Sophie Barrington.

the appropriate target for available potassium depends on soil type. When potassium levels are high, potassium inputs can be reduced from the fertiliser regime until levels fall.

Available sulphur

Sulphur is essential for nitrogen (N) fixation by legumes, such as lucerne or clovers. It is usually measured by the potassium chloride (KCl 40) test and is reported as mg/kg. This test takes into account some of the sulphur that will become available during the growing season from the breakdown of organic forms of sulphur.

Sulphur is considered adequate when the levels are > 4 mg/kg using the CPC test. Sulphur is considered adequate when the levels are > 8 mg/kg using the Blair (KCl 40) test. Plant analysis, especially a nitrogen-sulphur (N:S) ratio, is useful for diagnosing a sulphur deficiency.

Nutrients calcium, magnesium, sodium, aluminium and hydrogen are also typically recorded as plant-available values in the report, in addition to the extractable/ exchangeable values.

Table 4. Soil type and target levels of potassium (mg/kg)

	Sands	Sandy loams	Clay loams	Clays	Peats
Low	< 50	< 80	< 110	< 120	< 250
Moderate	50 – 100	80 - 120	110 - 160	120 - 180	250 – 350
Ideal	101 – 150	121 - 200	161 - 250	181 - 300	351 – 600
High	> 150	> 200	> 250	> 300	> 600

Table 5. Plant tolerance levels to salinity

Salinity rating	ECe (dS/m)	Species that will grow
Very low	< 1.8	All pastures and clovers
Low	1.8 – 3.8	Most pastures, crops, legumes
Moderate	3.8 – 6.5	Grass, some legumes
High	6.5 – 8.6	Grass, not clovers
Extreme	> 8.6	Salt tolerant plants, some barley grass

ABOVE: The primary goal of soil testing should be to inform efficient and effective resource management on your horse property. Photo by Sophie Barrington.

Cation exchange capacity

The cation exchange capacity (CEC) of a soil is the measure of the soil's capacity to hold important cations (positively charged ions), such as calcium, magnesium, sodium and potassium. Some laboratories also include aluminium.

The CEC measure provides an indication of the types and amount of calcium, potassium and magnesium available, and associated ratios, while exchangeable sodium is useful for determining potential soil structural problems. The CEC of the soil is largely dependent on the amount and type of clay and organic matter that is present (which results in greater CEC values than sandy soil).

The exchangeable cations are usually reported in unit of milli-equivalents per 100 grams (meq/100g) soil and also as a percentage of total cations.

Exchangeable calcium

Calcium is a necessary plant nutrient that plays a key role in maintaining soil structure and is generally present in high concentrations in the soil solution, even at low pH. Calcium deficiencies usually are found only on very acidic soils.

Exchangeable calcium should be > 5 meq/100g and in the range of 65-80% of the total cations present.

Exchangeable magnesium

Magnesium is also a necessary plant nutrient and is usually present in sufficient quantities to satisfy plant requirements. Exchangeable magnesium should be > 1.6 meq/100g and in the range of 10-20% of the total cations present. If exchangeable magnesium is more than 20% of the sum of cations present, it may result in potassium deficiency in plants and animals.

Calcium to magnesium ratio

Well-structured soils generally have twice the amount of exchangeable calcium to exchangeable magnesium. If the calcium to magnesium ratio is less than 2:1, this may indicate reduced soil stability.

In contrast, a calcium to magnesium ratio of more than 10:1 indicates a potential magnesium deficiency in plants and animals, including horses.

Exchangeable potassium

Potassium is an essential plant nutrient and is required in larger amounts. Exchangeable potassium should be > 0.5 meq/100g and in the range of 3-8% of the total cations present. If the exchangeable potassium level is more than 10% of the sum of cations, it may cause magnesium deficiency in plants and animals.

Magnesium to potassium ratio

The amount of magnesium should be one and a half times greater than the amount of potassium. If the ratio of magnesium to potassium is less than 1.5:1, this indicates an increased likelihood of magnesium deficiency in plants and potential grass tetany in classes of grazing animals.

Exchangeable sodium

Ideally, exchangeable sodium should be < 0.1 meq/100g and less than 1% of the total cations present.

If sodium makes up 6% or more of the total cations present, then the soil may be sodic and susceptible to dispersion - where a soil may lose structural integrity, compact and form surface crusts. The application of gypsum ($CaSO_4$) can help alleviate excess sodium in the short term.

Exchangeable aluminium

High exchangeable aluminium concentrations can be common in very low pH soils and may be toxic to plants. High aluminium levels can be reduced by applying lime. Aluminium levels generally fall to harmless levels once the pH (water) exceeds 5.6-5.8. The exchangeable aluminium level should be less than 1% of the CEC.

Salinity (conductivity)

Soil salinity is a measure of the total soluble salts present. High levels of soluble salts in the root zone may affect water and nutrient uptake, and adversely affect plant growth. Plants are more susceptible to salinity in their germination and seedling stage than in later stages of growth.

Soil salinity is generally determined by measuring the electrical conductivity (EC) of the soil sample, with results decisiemens per metre (dS/m). Ideal levels are less than 0.2 dS/m.

Soil salinity is a measure of the total soluble salts present. High levels of soluble salts in the root zone may affect water and nutrient uptake, and adversely affect plant growth.

Different pasture species have varying tolerance to soil salinity. Salt tolerance of plants is usually based on a different test - the electrical conductivity of a saturated extract method, ECe, which is also measured in dS/m. Salinity levels are satisfactory for all pasture species if the ECe is under 1 dS/m.

Summary

This article is meant to provide a basic understanding of how to read your soil tests and what some of these parameters tell you. Some soil reports may be more extensive and will report more values, such as trace minerals or heavy metals. This also depends on your chosen analysis package.

Additionally, the lab may record different measuring units. If this seems like too much information to digest at once, keep this article as a useful reference because I've aimed to bring the points that are more relevant to Australia and a horse property setting in particular.

Be sure to check the lab's website, as they may provide additional information (or even services) than can help you with the interpretation of your results. You can always opt to get your soil test done and reported by a soil service or agronomist that, at the same time, may assist you with soil and pasture recommendations.

Next month, we will discuss how you can use soil test results and what the best practice is to improve your soil values to support better soil, pasture and, ultimately, your horses' health!

The better you know your horse, the better your chances of recognising the early signs of colic. Image source: www.pixabay.com.

The Mystery of Colic in the Horse

WORDS BY Dr Morgan Weber
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Even though colic is a common ailment in horses, it can be mysterious and frightening for horse owners.

Colic is a generalised term referring to any type of abdominal pain in the horse and most commonly originates from within the gastrointestinal tract, or gut.

This article will focus on the gastrointestinal causes of colic to help horse owners broaden their understanding of the problem and be able to make informed decisions regarding their horse if colic does occur.

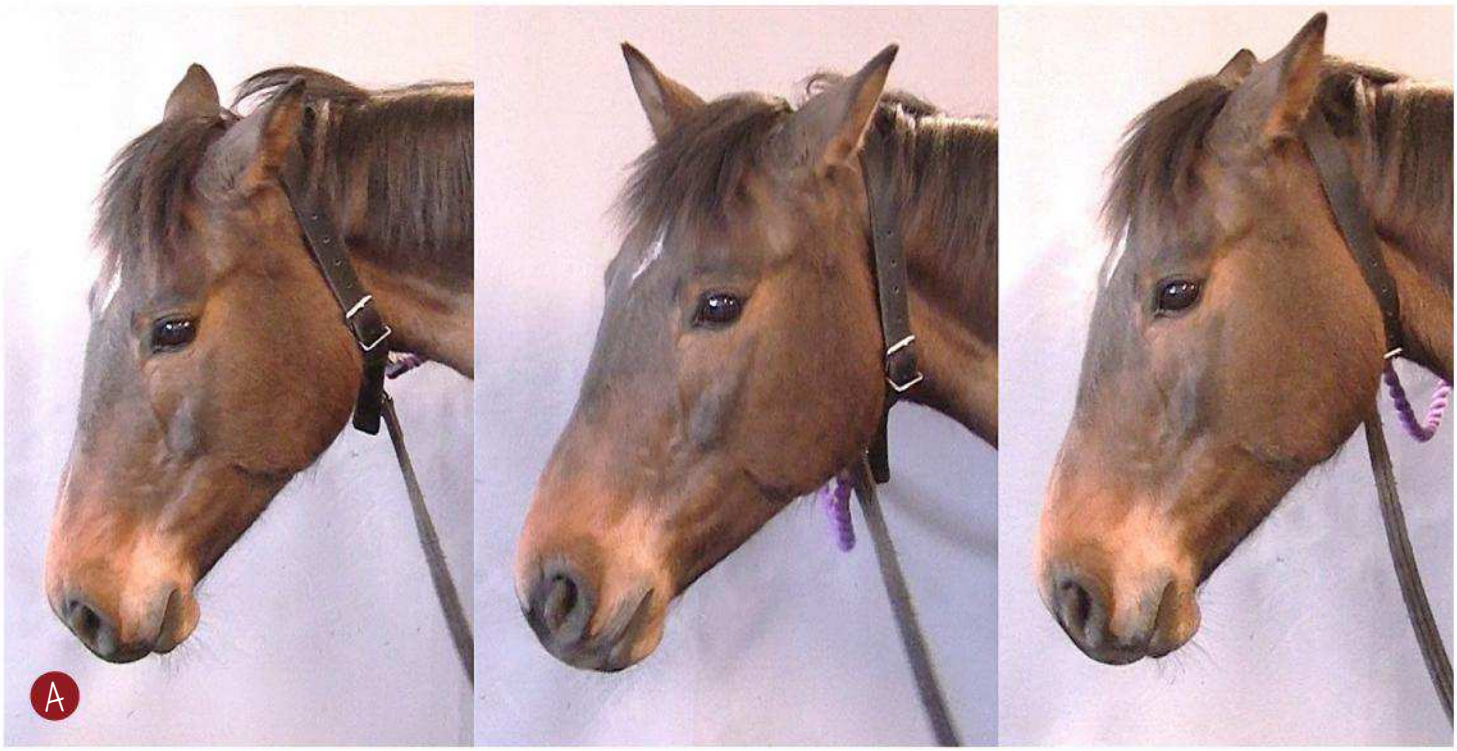
Clinical signs of colic can vary greatly from horse to horse. The most common symptoms include:

- Lying down,
- Rolling on the ground,
- Kicking at the abdomen,
- Flank watching (looking at abdomen),
- Pawing at the ground,
- Sitting like a dog,
- A swollen belly,
- Stretching out with the hind legs,
- Lack of appetite,
- Decrease in manure output, and
- Development of diarrhoea.

Horses may exhibit one or several of these clinical signs at the same time. Mild colic signs can quickly progress and become more severe in a short period of time. However, some horses are stoic; therefore, the severity of the clinical signs does not always coincide with the severity of the problem.

Early intervention and treatment of a horse with colic will increase the chance of having a favorable outcome. It is important to seek veterinary advice if your horse is showing any of the above clinical signs. A veterinarian can advise on the situation to determine if your horse may be monitored first or will require immediate veterinary attention.

Your vet may attend your horse on the farm or your horse may be required to be transported to a veterinary hospital for examination. For farm visits, it is important to monitor your horse until your vet arrives.



Following taking a history, your vet will perform a physical examination of your horse. This includes checking the eyes and colour of the gums, listening to the heart, lungs and gut sounds with a stethoscope, checking the legs and feet, as well as taking a temperature.

This includes not just monitoring their clinical signs, but also placing your horse in an area free of obstacles, including fences, equipment, or small and confined spaces, and/or by walking them to prevent injury. If your horse is lying down and rolling, it is essential to try and get them up safely.

Food should be withheld until your vet arrives. If loading your horse for travel to a veterinary clinic, your vet can give you advice on any treatment prior to loading.

To start with, they will take a thorough history by asking a series of questions, which may include:

- What symptoms is the horse showing?
- How long has the horse been showing these signs?
- How frequently are they passing manure? What is the consistency of the manure - soft and mushy or hard and dry?
- How much water are they drinking?
- When was the horse last wormed?
- If recently, what wormer was used?
- What is their dental history?
- Have there been any changes in feed, pasture or housing?
- Has the horse previously had colic?
- Has the horse had any treatment or medications?
- Is the horse insured for veterinary treatment?
- Are there any other horses on the property showing similar clinical signs?
- Is there any other relevant history pertinent to the horse?

Following taking a history, your vet will perform a physical examination of your horse. This includes checking the eyes and colour of the gums, listening to the heart, lungs and gut sounds with a stethoscope, checking the legs and feet, as well as taking a temperature. Further diagnostic tests may be recommended based on their initial findings.

Once the external areas of the body are checked, your vet may pass a tube through the nose of your horse and into the stomach (nasogastric tube).

IMAGE A: Horses are stoic by nature and very good at masking signs of pain. Scientists, however, identified subtle facial features that indicate severe pain. On the far left, note the tension around the eyes and nostrils, and the lowered ears associated with a 'pain face'. Compare this to the other two photos of the horse relaxed and not in pain. Learn more about the 'Equine Pain Face' at: https://bit.ly/2jQTaNB. Image courtesy Karina Bech Gleerup.

IMAGES B & C: Whilst it is normal for a horse to lie down and roll during a bout of colic. they may do this repeatedly and often will display a combination of behaviours, facial expressions and physiological signs that indicate pain in the abdomen. The better you know what is normal for your own horse, the better you will recognise when things are not. Images source: www.pixabay.com.

If the stomach is enlarged from fluid or gas buildup, the tube allows the fluid to escape and gives the horse some temporarily relief.

Fluid or gas buildup may occur in the stomach due to a partial or complete obstruction of the intestines further down the line. Your vet may then be able to directly medicate your horse through the tube if treatment (drench) is required.

Drawing a sample of blood and testing it for different factors can help determine if your horse has any signs of infection (haematology), inflammation (fibrinogen and serum amyloid A), organ problems (biochemistry), dehydration or shock (haematocrit and total protein), and abnormal electrolyte values (not eating or lost via diarrhoea).

An abdominal ultrasound can be very helpful in determining the state of the intestines. If the intestines are distended with gas (twisted or blocked), thickened (don't absorb nutrients very well), not moving (decreased motility/ileus) or have abnormal structures which could be causing a problem (abscesses or tumours), then these may be detected with an ultrasound examination.

An increase in the amount of fluid in the abdomen can also be seen, and may indicate infection or inflammation within the abdomen (peritonitis), or abnormal positioning of the intestines (twists, rupture or entrapments). If there is increased fluid in the abdomen, your vet will likely suggest taking a sample of that fluid (abdominocentesis) to check its colour, amount and if there is infection present (fluid analysis).

A rectal examination might be the next diagnostic step to investigate colic symptoms. Your vet will carefully palpate the abdomen from the inside by inserting their hand and arm into the rectum of your horse. This will help them to determine if the intestines, colon or caecum are in the wrong place (displacement), and check for gas expansion of the intestines. They may also collect a sample of faeces at the same time to perform a faecal egg count to determine if there is any worm burden.

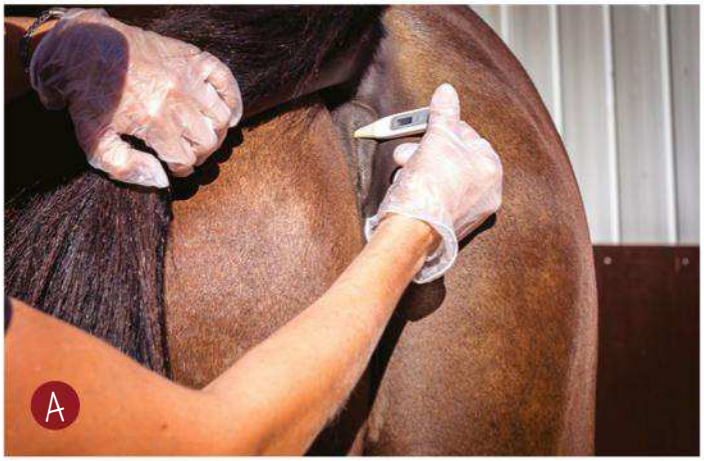


IMAGE A, B & C: Practice taking your horse's temperature, respiration and heart rate, as well as checking the capillary refill time, so you can establish what is 'normal' for your horse. That way, you will be able to recognise differences that may indicate your horse is unwell. Providing these observations to your vet over the phone will also help them make a better assessment of the urgency of the situation.
Photos by Linda Zupanc.

Learn More

To learn more about the clinical signs of colic, watch our video at: **https://www.youtube.com/watch?v=k6q-Zh6ZKNM**.

> A horse may have one type of colic or many at the same time. Despite numerous diagnostic tests available, there are colic cases where a definite cause is never found.

There are numerous causes and types of colic that can be seen in horses:

- Partial or complete obstruction of the large or small intestine, which includes feed/sand impaction, foreign bodies, faecal stones (enteroliths), intussusception or parasites.
- Spasmodic colic, which is irregular (spasmodic) contractility of the gastrointestinal tract.
- Strangulating obstruction (gut is twisted around cutting off the blood supply to the intestine), which includes small or large intestinal torsion/volvulus, or a pedunculated lipoma (fatty tumour on a long piece of tissue, which wraps around the gut like a piece of string cutting off the blood supply).
- Displacements where the intestines have moved to the wrong anatomical location. Dorsal displacements of the colon or nephrosplenic entrapments (gut trapped between tissue stretching from the spleen to the kidney).
- Inflammation of the small intestine (enteritis), large intestine (colitis) or stomach ulcers.
- A tumor or abscess attached to the intestinal wall, or encompassing the intestines.

A horse may have one type of colic or many at the same time. Despite numerous diagnostic tests available, there are colic cases where a definite cause is never found.

Treatment of colic can be medical or surgical, depending on the type and severity of the clinical signs. Most suspect impactions, enteritis, colitis and, occasionally, displacements can be resolved with medical treatment.

This may be basic therapy (pain relief and drenching) or complex (pain relief, fluid therapy in the vein, antibiotics, plasma therapy and hospitalisation). Pain relief may be in the form of anti-inflammatories, sedatives and/or opioids. A drench may be administered through a nasogastric tube as previously detailed and can include a combination of electrolytes, a fecal softener or paraffin oil, and water.

IMAGES A, B & C: Colic surgery is necessary in cases where there is severe pain or the horse fails to respond to medical treatment. Despite the risk of complications associated with any complicated surgery, colic surgery has very high success rates. Photos sourced online.

IMAGE D: Pale membranes. Image courtesy WestVETS.

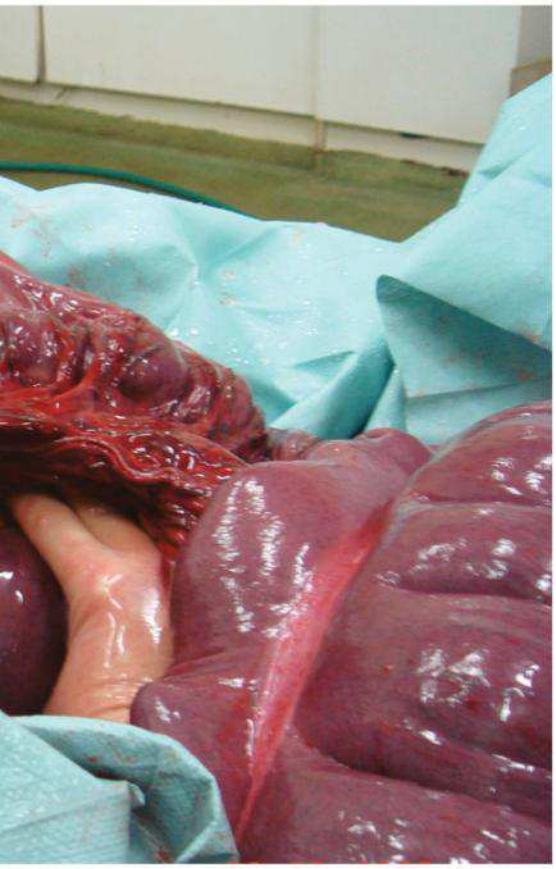
IMAGE E: Toxic membranes. Image courtesy WestVETS.

The aim of a drench is to correct any dehydration (encourage drinking) and soften the intestinal contents to encourage easier passage. Initial basic medical treatment may be performed on the farm.

In severe cases of colic, more complex therapy may be required, often at a veterinary clinic. Hospitalisation allows for constant monitoring and continuous fluid therapy. Continuous fluid therapy rehydrates your horse, and can soften gut contents or maintain fluid in the body if there is diarrhoea.

Medication may be given to support gastrointestinal motility, provide additional or constant pain relief, treat infections (antibiotics), prevent ulcers, and replace any electrolytes lost from not eating or due to diarrhoea.

Surgical treatment of colic is necessary in cases where there is severe pain or the horse fails to respond to medical treatment. Surgery (exploratory laparotomy) is necessary to correct severe impactions, displacements, torsion/volvulus, or remove dead bowel or tumors.



Post-operative care is aimed at supporting the healing process with medical treatment and slow re-introduction of feed. In some instances, there may be complications to recovery from surgery. These may include decreased intestinal motility (ileus), infections of the surgery site, the intestines adhering together (adhesions) or infection inside the abdomen (peritonitis).

Horses without post-operative complications are generally able to go home within 5-7 days following surgery. The survival rate for horses undergoing colic surgery and recovering from anesthesia can be as high as between 80 and 90%, depending upon the cause of the colic, and most go on to lead successful careers as show horses, racehorses or beloved riding horses.

Having a good working relationship with an equine veterinarian is helpful in choosing the level of care, diagnostic tests and treatment for any horse with colic, and will increase the chance of having a favorable outcome to any episode.

Recognising the clinical signs of colic and receiving prompt veterinary attention can be the key to a horse recovering quickly with the least amount of pain. Having a good working relationship with an equine veterinarian is helpful in choosing the level of care, diagnostic tests and treatment for any horse with colic, and will increase the chance of having a favorable outcome to any episode.

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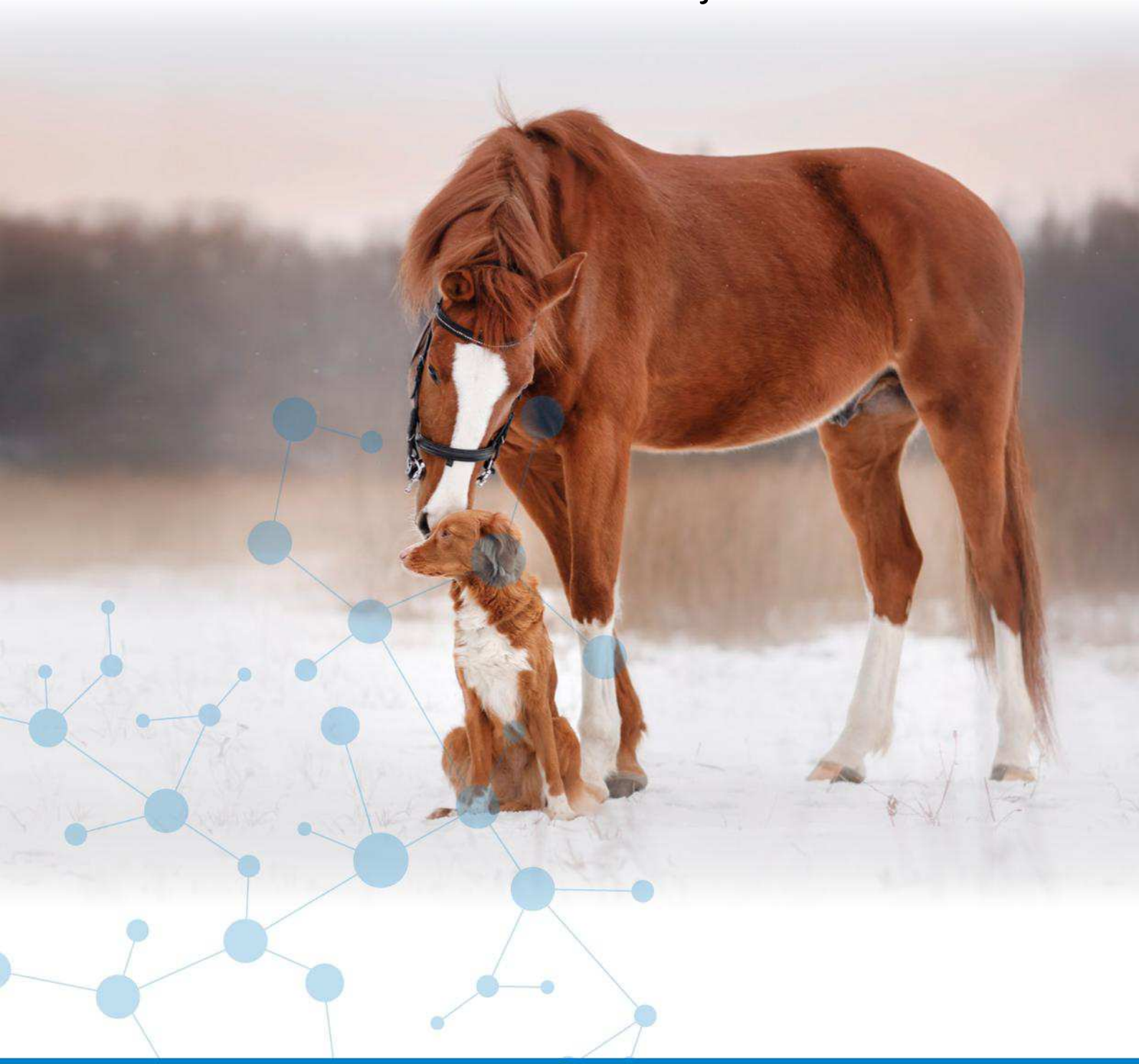

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Feeding for Weight Gain

WORDS BY Tania Cubbitt PhD
www.hygain.com.au

Image courtesy HyGain Feeds.

Some horses do not maintain their bodyweight easily and it can prove a real challenge to keep them at an ideal weight. Ultimately, your horse's ribs should not be visible, but they should be easily felt if you run your hand along your horse's side.

A common complaint from horse owners is their horse hasn't got enough topline. This is achieved through the horse working in a manner that strengthens the muscles in their back and the correct diet of quality protein, which helps to build muscle.

Regularly monitoring your horse's weight with a weight tape or livestock scale will allow you to identify any changes to their weight early, thereby enabling you to make corrective actions quickly. But first, we must understand why the horse is underweight.

What causes weight loss?

Weight loss can be credited to a number of factors, only some of which are feed-related. The first factor that should be checked when assessing causes for weight loss is the condition of the teeth. Proper dental care is essential to a horse because of the nature of their diet. Horses evolved eating coarse roughage and plant materials that require thorough grinding by the molars to break down the particle size of the food.

Poor worming regimes can also cause weight loss, regardless of what and how much you are feeding. Parasites may compete directly for the nutrients inside the digestive tract. They may also cause damage to the intestinal lining, making it difficult to absorb nutrients. Damage to the intestinal lining can diminish the production of enzymes needed to prepare food particles for absorption.

Stress can also contribute to weight loss. If your horse is a chronic stall walker, weaver or fence runner, they are burning calories needlessly all day long. Simple management changes, such as daily turnout or the addition of a stall buddy, can alleviate these behaviours. High grain, low roughage diets can also cause stress, as a result of gastric ulcers that are painful to the horse and may discourage them from eating.

Disease or illness can also interfere with weight gain - either by decreasing the horse's appetite or by directly affecting nutrient absorption within the digestive tract. An example of this would be chronic liver disease due to the decreased ability to handle protein and fat properly. If all these can be eliminated and your horse is still not putting on weight, the next step is to evaluate your horse's diet.

What should I feed?

Fibre: Of the three major energy sources (fibre, carbohydrates and fat), fibre is the most important. Fibre is the major component of pasture and hay. Some horses can maintain their weight on fibre sources alone. For the poor doer, however, fibre alone will not maintain weight, but there are fibre sources with higher energy content and digestibility than others. When comparing the energy content of lucerne and grass hays, lucerne hay can provide a horse with more energy than grass hay of similar quality. However, low-quality lucerne hay, which has more stem than leaf, is not a rich source of energy.

When quality pasture or hay is not available, or if the horse does not readily eat hay or have access to pasture, there are alternative fibre sources that can be added to the diet, such as HYGAIN® FIBRESSENTIAL®, the nutritionally enhanced chaff nuggets. The most common are 'super fibres', such as beet pulp and legume hulls (soy or lupin hulls).

HYGAIN MICRBEET® is a beet pulp-based alternative fibre source. The fibre in beet pulp is about 80% digestible (as compared to 50% for average hay). Soy and lupin hulls are the skin of the bean (not the husk or pod) that is knocked off before oil is extracted from the bean. The energy content of legume hulls is close to that of oats. Certain additives, such as yeast, may help with fibre digestion if the horse has a problem with the balance of microbes in the large intestine. Yeast has been researched and found to improve fibre digestibility. Many feeds from the HYGAIN® range contain probiotics - live yeast-based additive that assists with fibre, calcium and phosphorous absorption. Maximising forage quality should be the first dietary adjustment when trying to achieve weight gain.

Carbohydrates: Carbohydrates, specifically sugar and starch, in the form of grains have been the most traditional method of increasing the energy density of the diet. Obtaining energy from sugar and starch is very efficient due to their simple enzymatic processes. While grain is a concentrated source of energy for the horse, there are some complications with feeding large quantities. The small intestine can easily become overloaded with sugar and starch, resulting in an overflow into the large intestine. This can lead to gas colic, colonic ulcers and even laminitis. When trying to get a thin horse to gain weight, it is often tempting to keep increasing the amount of grain being fed. Unfortunately, if too much grain is fed and the delicate microbial population in the large intestine gets disturbed, most horses will lose their appetite and the situation worsens. Care should be taken not to feed any more than 2kg of grain in a single meal. When large amounts of grain are fed, it should be divided equally over three or more meals throughout the day. Make sure the horse is always getting at least 1.5-2% of their bodyweight in the form of fibre, and a good rule of thumb is to try and stick to a roughage to grain ratio of around 70:30.

Fats: Fats and oils are commonly used in horse feeds to increase the calorie content of the feed or to replace the calories supplied by grains. Fat supplementation has many benefits, including providing calories for weight gain, and providing essential fatty acids to improve skin and coat condition. Feeding fat has also been reported to decrease excitability in nervous horses. Both animal fats and vegetable oils have been fed to horses, although the use of vegetable oils, such as soy, rice bran or canola oil, is more prevalent due to superior palatability.

Fat sources, such as HYGAIN® RBO®, rice bran oil or soybean oil contain 2.5- 3 times more energy than grains on an equal weight basis. Increasing the fat level of the diet is the easiest and safest way to increase the energy density of the diet. Higher energy levels can be obtained by feeding a lesser amount of a high-fat concentrate mix, compared to a concentrate mix containing lower-energy grains. Research has indicated adding 5-10% fat to the total diet has maintained the bodyweight of horses with a 21-25% decrease in concentrate intake. HYGAIN® SHOWTORQUE® is a high fat, no cereal grain textured concentrate, ideal for safe weight gain. Adding fat to a horse's diet permits safe weight gain, while reducing the chance of colic or founder. Digestion of fat also yields less internal body heat, when compared to other diets. Thin horses will gain weight and do so without having to eat as much grain if the diet is fortified with additional fat.

How long will weight gain take?

Gaining weight on your horse will not happen overnight and horse owners should have reasonable expectations as to how long it will take to avoid disappointment. The 2007 National Requirements for Horses suggested it takes 16-20kg of gain to change a horses body condition score by 1 unit (based on a 500kg horse; 1 to 9 scale). Therefore, a horse with a body condition score of 2 would need to gain around 60kg to increase their condition score to a 5. This would take around six months to achieve and would require a very energy-dense feeding protocol. It is safe to assume a horse can gain one condition score per 60 days, when provided with adequate additional dietary energy and no underlying disease is apparent.

Take home message

Whether your horse is underweight, overweight or just right, it's important to evaluate their condition through advancing age, environmental changes and performance demands regularly. Addressing unwanted fluctuations before they become potential health risks is the key to maintaining optimal bodyweight. After addressing all possible causes for the horse's weight loss, increasing the amount and quality of fibre the horse is receiving should be the first dietary change made, followed by increasing the energy density of the concentrate portion of the ration.

Advanced assisted reproductive techniques raise a number of moral and ethical questions, which must be closely scrutinised if we are to go forward with a clear conscience. Image source: www.pixabay.com.

Embryo Transfer: Playing God or Employing Good Science?

WORDS BY Sonja Vandermark
BSc (Hons) Equine Science and Technology

The practice of embryo transfer is becoming more and more accessible to breeders as a way of obtaining offspring from mares who might be compromised through age, fertility problems or injury in their ability to produce a healthy foal, or from those who still have an active competition career and can't afford the 'time off' for active pregnancy. It is also becoming an important 'life raft' in the preservation of rare breeds.

With advanced assisted reproductive techniques (ART's), it is now possible to produce a foal from the union of a deceased stallion and a top level competition mare who continues to compete throughout. Indeed, it is possible to produce several foals from this union in a single year!

Of course, these practices raise a number of moral and ethical questions, which must be closely scrutinised if we are to go forward with a clear conscience. We must consider the ethics and wellbeing of all involved, including both the donor and recipient mares, and the resulting offspring. But, does that consideration extend to the embryonic stage? Does the embryo itself deserve the same rights and ethical concern as the resulting horse that it will become?

> The notion of 'embryo suffering' is explored. Can embryos feel pain? To date, there is no suggestion, based on scientific evidence, that embryos are capable of suffering.

In a recent feature, the Equine Veterinary Journal (EVJ) presented four papers looking at various aspects of embryo transfer. As an introduction, Madeleine Campbell, European Diplomate in both Equine Reproduction and Animal Welfare Science, Ethics and Law, presented a discussion of the ethical concerns that might arise concerning equine embryos (defined as being less than 42 days of gestational age).

The introduction explores the questions of whether we ought to be worried about the use of embryos in equine research and, in particular, the damage or destruction of them for research purposes, or during the embryo transfer process itself.

Campbell explains any damage to embryos which causes the future pain, suffering, stress or discomfort of the postnatal foal should be cause for ethical concerns on the grounds of welfare, but asks whether the damage or death of equine embryos in and of themselves should be a matter of ethical concern.

In the United Kingdom, legislation dictates that animals are only protected by regulations governing experimental design and clinical procedures in the third trimester of pregnancy onwards, with no provision for the younger neonate.

The notion of 'embryo suffering' is explored. Can embryos feel pain? To date, there is no suggestion, based on scientific evidence, that embryos are capable of suffering and, therefore, there is no evidence-based rationale to suggest a welfare concern about damage or death of embryos themselves, unless they are allowed to continue their development through to the third trimester.

But, is it morally right to use embryos experimentally; to use them in embryo transfer with variable success, or to 'squeeze' them - as the process is called - if there happens to be more than one occupying the same uterus?

IMAGE A: A 25-day conceptus showing the embryo and division between the developing allantois (ventral) and regressing yolk sac (dorsal). Reproduced with permission from Equine Veterinary Journal from Allen, W.R. and Wilsher, S. (2018) Half a century of equine reproduction research and application: A veterinary tour de force. Equine Vet. J. 50, 10–21.

IMAGE B: Advanced assisted reproduction techniques can have a crucial role in the preservation of rare breeds. Image courtesy Illawarra Equine Centre.

IMAGE C: Artificial insemination is now a routine reproductive procedure. Image courtesy Illawarra Equine Centre.

> What about all the positive outcomes from embryo transfer? The use of this improving technology in the preservation of rare breeds, such as the Suffolk Punch from the United Kingdom and the ancient Przewalski horses of Mongolia, is proving a valuable tool.

If our moral concern is based on the animals' ability to suffer, then clearly, there is no concern where embryos are concerned, right?

When we consider human embryos (with no evidence to suggest they can suffer or feel pain), which are still considered worthy of respect simply because they represent potential people, should we then consider equine embryos, with the same respect as potential horses? Should horses have the same moral rights as humans, including the right to life?

Campbell suggests, if we are comfortable with the notion of equine euthanasia, even for non-welfare-based reasons, and taking the life of a horse is morally acceptable, as long as it is done humanely, then we should concede we do not believe horses have the same right to life as humans. And, with this argument in mind, it makes no sense to consider the rights of the embryo as any greater than the rights of the resulting horse that it might become. Campbell argues there is no coherent argument the treatment of embryos should be considered as an ethical dilemma.

What about all the positive outcomes from embryo transfer? The use of this improving technology in the preservation of rare breeds, such as the Suffolk Punch from the United Kingdom and the ancient Przewalski horses of Mongolia, is proving a valuable tool that might make all the difference in the survival efforts for these breeds, amongst others.

The Suffolk Punch is a much loved and iconic draft breed in the United Kingdom, which has difficulties with fertility, possibly due to closely connected bloodlines. Semen for artificial insemination (AI) is difficult to obtain and mares often have trouble maintaining a pregnancy once successfully inseminated.

The situation for the critically endangered breed is so dire experts have recently predicted we have less than 10 years to act before the breed disappears entirely.

There remain just 80 viable breeding females in the United Kingdom, meaning the Suffolk Punch is now in the top three breeds of farm animals facing extinction. In a bid to save the iconic breed, genetic samples are being taken and stored cryogenically with the aim that future technologies will allow a resurrection from this material, should the current preservation activities in place prove unsuccessful in the long-term.

In the meantime, embryo transfer is providing a way to increase the number of pregnancies by using large draft breed surrogates to carry the valuable offspring to term. In Australia, between 2016 and 2017, five Suffolk Punch foals were born - four of which were embryo transfers. But, the process is expensive and prohibitively so in some cases. Fundraising by breed societies is helping to increase the viability of embryo transfers for some breeders, but the breed is still in grave danger of disappearing if assisted reproductive techniques are not more widely available.

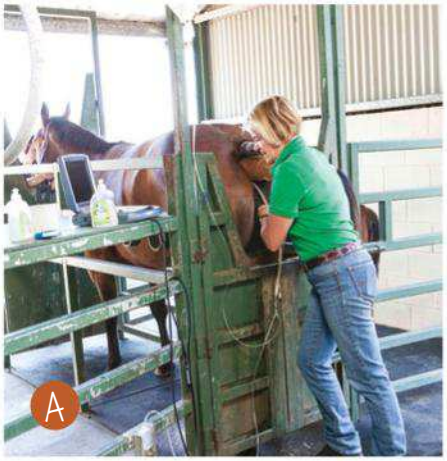
IMAGE A: The embryo is recovered (flushed) from the donor mare before it implants and is introduced into the uterus of a recipient, or host mare. Image courtesy Illawarra Equine Centre.

IMAGE B: Mares used as recipients (hosts) have to be in excellent health. Image courtesy Illawarra Equine Centre.

IMAGE C: The Equine Veterinary Journal recently published a special section discussing the ethical concerns that might arise concerning equine embryos. Image courtesy Illawarra Equine Centre.

IMAGE D: Any damage to embryos, which causes the future pain, suffering, stress or discomfort of the postnatal foal, should be cause for ethical concerns on the grounds of welfare. Image source: www.shutterstock.com.

IMAGE E & F: Embryo transfer is providing a way to increase the numbers of critically endangered species, like the Przewalski and the Suffolk Punch. Images source: www.shutterstock.com.



F

E

> Embryo transfer allows the combination of very specific genetics from the mare and stallion, and a far larger number of foals born to that coupling than would be possible naturally. The technology means far less chance of genetic disease, as well as overcoming the geographic limitations of breeding a certain mare with a certain stallion.

In Mongolia, the battle to save the critically endangered Przewalski horse has been a long and arduous one. As the last remaining breed of truly wild horse, the issues surrounding their dwindling numbers include a diminishing habitat, as well as an ever decreasing gene pool. The Przewalski is one of the oldest surviving breeds of horse and is familiar as a breed depicted in cave paintings by our early ancestors. Due to habitat loss, and increasing difficulty of finding food and water, their numbers have been dwindling for many years.

Early attempts at capturing and breeding in captivity proved challenging, with many young horses not surviving the ordeal. The small numbers of stallions meant a very small gene pool from which to breed the captive animals. Genetic weaknesses ensued, hampering future efforts to increase numbers. The main purpose of the Species Survival Plan (SSP) is to maintain a healthy and genetically diverse wild population of horses. To this end, horses and genetic material are now transferred between zoos all over the world, to ensure as large a gene pool as possible.

Out of 80 zoos worldwide hosting the Przewalski horse, 20 to 30 will produce foals each year. Many horses will be successfully re-introduced to the wild, thus increasing the population and genetic diversity of the wild herds. Recently, embryo transfer has entered the toolbox, which breed conservationists have used to help maintain the breed. Nine pure Przewalski embryos were successfully transferred surgically and two non-surgically to domestic mares. Seven of the embryos became viable pregnancies and four foals were, ultimately, born.

Embryo transfer allows the combination of very specific genetics from the mare and stallion, and a far larger number of foals born to that coupling than would be possible naturally. The technology means far less chance of genetic disease, as well as overcoming the geographic limitations of breeding a certain mare with a certain stallion. The use of embryo transfer, along with other technologies, may just be the difference between survival and extinction for this important horse breed.

Whilst 'messing with nature' will always raise a healthy amount of debate, and questions of ethics and morality, if we can make a positive difference to the lives and, indeed, the very survival of horses by employing it in a thoughtful and clearly planned programme, then surely the ends must justify the means?

Whether we should be using the technology to breed the next fastest racehorse or the best eventer from a mare still competing actively, or whether fears of 'designer foals' with genetic traits picked from a list and meddled together in the laboratory are warranted, the technology as it stands today is not to be feared in and of itself.

So long as we continue to ask the pertinent questions, and be truthful about the potential risks and ethical considerations, can we agree the benefits outweigh the concerns with the technology we have available?

The Equine Veterinary Journal (EVJ) special focus section appeared in the May 2018 issue, including four research papers examining some of the latest methods, protocols and success factors involving embryo transfer.

The special focus is available free online at: **https://onlinelibrary.wiley.com/toc/20423306/50/3**.

Learn more about embryo transfer on our website: https://www.horsesandpeople.com.au/article/embryo-transfer.

2018 KEN FAULKNER CLINIC DATES

7 -8 June 2018
2 Day Cowboy Dressage Clinic
Esk, QLD
Belinda Gregson
0488 958 669

9 - 10 June 2018
Official Cowboy Dressage Show
Esk, QLD
Belinda Gregson
0488 958 669

15 June 2018
View from 'C'
Elmore, VIC
Kathy Faulkner
0427 732 394

16 - 17 June 2018
Official Cowboy Dressage Show
Elmore, VIC
Belinda Gregson
0488 958 669

22 - 24 June 2018
3 Day Horsemanship Clinic
Winchelsea, VIC
Narelle Unmack
0418 540 770

25 June - 8 July 2018
Young Horse Starting Intake
Esk, QLD
Kathy Stewart
0427 732 394

9 - 12 July 2018
4 Day Savvy Weekend
Esk, QLD
Kathy Stewart
0427 732 394

17 - 22 July 2018
6 Day Horsemanship Clinic
Devon, UK
Heather Seems
+4477 0313 2932

24 - 29 July 2018
6 Day Horsemanship Clinic
Wales, UK
Louise Parker
+4477 0240 0074

3 - 4 August 2018
2 Day Cowboy Dressage Clinic
Wandilo, SA
Joanne Vine
0417 831 397

5 August 2018
Wandilo Cowboy Dressage Show
Wandilo, SA
Belinda Gregson
0488 958 669

11 - 12 August 2018
2 Day Cowboy Dressage Clinic
Ovens, VIC
Jennifer Hawkins
0427 302 598

18 - 19 August 2018
2 Day Cowboy Dressage Clinic
Geelong, VIC
Jennifer Hawkins
0427 302 598

25 - 26 August 2018
2 Day Horsemanship & Cowboy Dressage Clinic Cordalba, QLD
Sharon Dickson
0412 675 219

21 - 24 September 2018
4 Day Savvy Weekend
Allora, QLD
Belinda Gregson
0488 958 669

Ken Faulkners' Australian Horsemanship

Ken Faulkner
Australian Natural Horsemanship
PO Box 99, Esk QLD 4312
0427 732 394

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Horses Helping Humans

WORDS BY Sue Spence
www.horseshelpinghumansaustralia.com

Now in its 14th year, Horses Helping Humans (HHH) has recently won its third Business Award this year for 'Youth and Children's Services 2018'. Founder Sue Spence invites you to become a licensee and facilitator for this internationally renowned horsemanship and life skills program.

HHH has had thousands of young people successfully complete this program that is built on professional horsemanship skills, whereby students work to achieve connection and respect with their horses and ponies, and demonstrate their skills in a presentation show at the end of their three-week course.

"Watching students who have never felt good at anything receive their trophies and ribbons on show day can still give me goosebumps!" says Sue Spence. "To receive the feedback from Youth and Family Services of the outcomes of re-engagement into school or study is an absolute honour."

With academic and scientific research behind all the techniques taught, HHH maintains strong relationships with local universities, including a partnership with Griffith University's Internship program.

HHH is not equine therapy - although students find it extremely therapeutic. It is a life skills and communications program in which students learn to understand personality types, body language and breathing techniques that help them develop emotional regulation. Now developed as a resource for counsellors and schools to educate young people on anxiety, depression and ADHD, HHH's 'Which horse or pony are you?' course helps students become aware of their temperament and conditioned responses.

"Understanding personality types assists young people immensely in finding their identity, so they can aim towards study or jobs that will suit their individual needs," says Sue. "Within their first session, students are backing up their horses or ponies, circling them and even popping them over jumps.

Those with high anxiety or anger issues very quickly learn, unless they change their body language and adjust their breathing, they will not have the connection they need to achieve the groundwork skills they are working on.

"I want to see more HHH centres open across Australia led by amazing Licensees with hearts to help their communities. I am so proud when I hear the feedback and stories of my Licensees and see what a blessing they are to the young people in their areas." To learn more about becoming a licensee, visit: www.horseshelpinghumansaustralia.com.


Dublin

Helmets: 20 (More) Reasons to Put a Lid on It

WORDS BY Kirrilly Thompson PhD

Horse riding is dangerous. I'm not going to go into the statistics on horse-related injury and fatality because they are far from straightforward. Do you calculate injury rates per ride, per hour spent in the saddle or per jump attempt?

Suffice to say that all accidents range from annoying to tragic, and the statistics for any sport as a whole are not going to matter when an accident happens to you or someone you know.

Very few horse riders would deny the fact that a helmet will mitigate the severity of a contact injury to their head, but for many riders, this is not reason enough. Not every horse rider wears a helmet every time they ride for various reasons that might even make seem to sense (e.g. "I wouldn't get on a horse if I thought I was going to fall off"), but which just don't pass muster. Rather than focus on the excuses for not wearing a helmet, let's consider at least 20 other reasons to embrace the skid lid.

1. Even your horse is dangerous

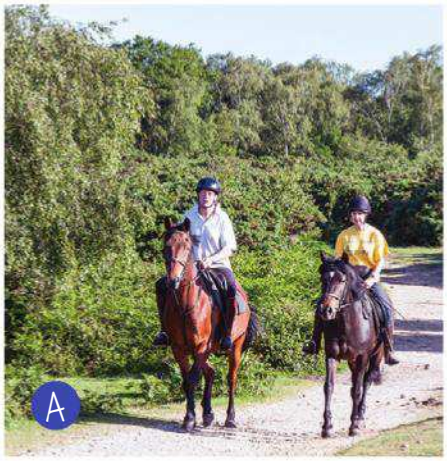
My research has found that many riders consider horse riding dangerous, but they don't think they are taking risks with their own horse. Sadly, this is just not the case (See point 9 below: Manure happens), but this doesn't mean your relationship with your horse or decision-making is any less reliable. In fact, a helmet is not a replacement for a whole host of safety-related decisions that horse riders routinely make. So, if you are going to make those, why not just add a little sugar on top?

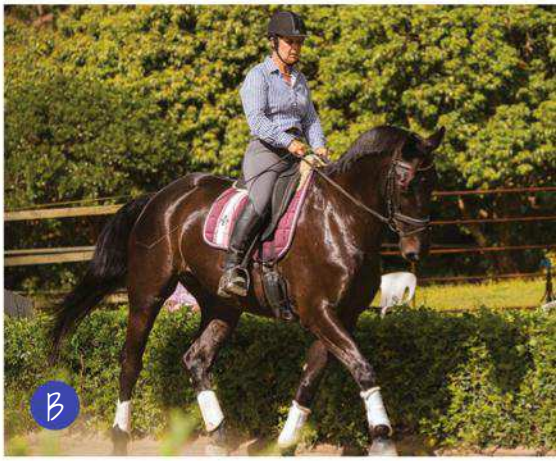
LEFT: The author with a little sugar on top. Photo by Sally Harding.

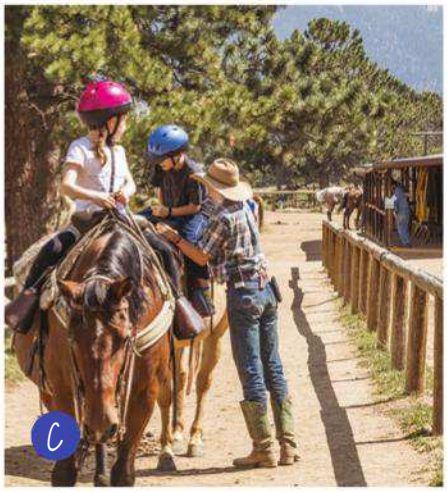
IMAGE A: Helmets aren't just for falls. A helmet will protect your head if your horse slips, if you are hit by a car, if a magpie swoops or if you misjudge a tree branch while on the trail. Image source: www.shutterstock.com.

IMAGES B, C & D: If you take safety seriously, and you choose to support other people who take safety seriously, you can be a leader for the greater good of your sport. Photos B & D by Linda Zupanc. Image C source: www.shutterstock.com.

IMAGE E: Helmets look professional. Professionals attract students, sponsors, goodwill and good fortune. Photo by Sally Harding.







2. Helmets work

No - helmets will not stop your neck or back getting broken, but that's not what they are designed to do. Whilst wearing a stack hat is no guarantee you won't suffer a head injury, wearing one sure will reduce the severity of an injury and reduce your recovery time.

3. Helmets are easy to use

Your confidence might be dented each time you try to find which string to pull on your bag of chaff, but you will always be a champion at putting a helmet on your head and doing up the strap. The ground is hard, wearing a helmet is easy.

4. Helmets are affordable

We all know you could spend close to a thousand dollars on a helmet if you wanted to, but you can buy an approved helmet for around the cost of a riding lesson. Maybe even less. You don't even need a separate helmet for competitions. Helmet covers are a great way to keep show helmets clean and unmarked during training (see point 15 below: Helmets can be cool!).

Many companies celebrate International Helmet Awareness Day each year on September 17 with special discounts. Follow www.riders4helmets.com for more information.

5. There is a helmet to fit you

Even the biggest egos can be accommodated by trying enough brands and styles.

6. Ain't nobody got time for a head injury

You would rather be riding. Riders suffering serious concussions or bone fractures may need to stay off their horse for six months to reduce further injury. Trust me on this one.

7. Protect your investment

How much time and money have you spent learning the knowledge and skills that you bring to the saddle every time you ride? Most, if not all of that, is stored in your head. Do you really want to put that at risk? I didn't think so. Put on your brain bucket.

8. Your horse is worth it

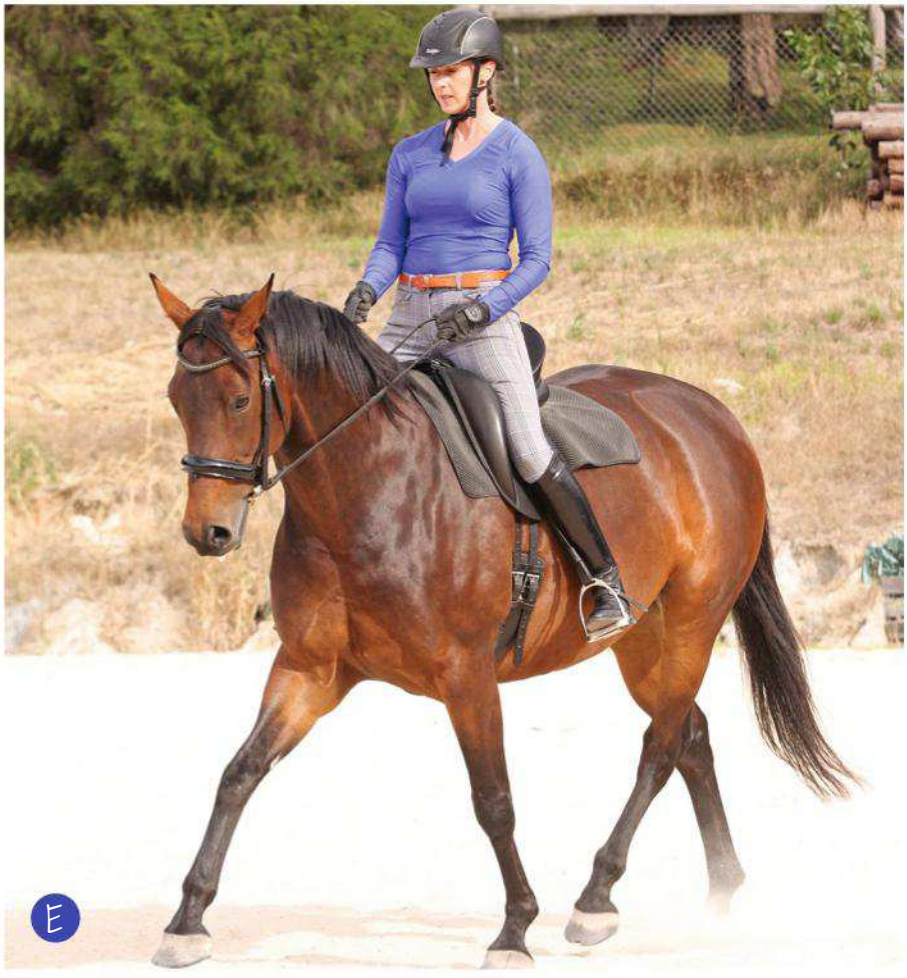
If you get sidelined in hospital, or worse, who will look after your horse, and can they do it as well as you do and for as long as you might need? You can even pledge to wear a helmet for the good of your horse at the Facebook group 'Who are you staying safe for?' Visit: https://www.facebook.com/groups/1409019799389433/

9. Manure happens

Helmets aren't just for falls. A helmet will protect your head if your horse slips, if you are hit by a car, if a magpie swoops you, if you misjudge an overhanging branch or if a eucalypt drops one as you pass below.

10. Helmets protect your reputation

They look professional. Professionals attract students, sponsors, goodwill, good fortune and other opportunities.



11. Experience is good, but not that good to justify no helmet

Experience is not nearly as good at protecting your noggin' as a helmet. Novice riders might lack the experience to prevent an accident, but then they might be quite cautious. They may also spend fewer time around horses. In risk management terms, this means they have a relatively low exposure to risk.

Professional riders, on the other hand have a high exposure to risk. That is, odds are the more time they spend around horses, they more likely they are to get injured - even if they know how to avoid them. Experienced riders might have less exposure than professional riders, but anyone can become complacent around horses and accidents can happen (See point 9 above: Manure happens).

12. You might not blame someone else for an accident, but your insurers might

You could be putting your friends, family, clients or others you know at risk by not wearing basic personal protective equipment, like a helmet, when you ride or handle their horse.

13. Riding requires taking responsibility

You have a duty of care to people who ride or handle your horses, especially but not only when you pay them. Protect yourself from legal action and personal regret by requiring others wear a helmet when riding, or when handling your young or difficult horses.

Yes, you can request your vet/farrier/trimmer/coach/rider/transporter/trainer wears a helmet. How seriously they take you will depend on many things, including how seriously you take safety. Culture change starts with individuals. Wear a helmet every time you ride and compliment others who do too - especially the role models and professionals in our sport.

If you take safety seriously, and you choose to support other people who take safety seriously, you can be a leader for the greater good for your sport. Does it matter that your idols don't wear helmets? Have you noticed all the champions who do?

14. You can be a leader

If you take safety seriously, and you choose to support other people who take safety seriously, you can be a leader for the greater good for your sport. Does it matter that your idols don't wear helmets? Have you noticed all the champions who do? Have I already mentioned culture change starts with individuals, like you?

15. Helmets can be cool!

You don't have to wear a golden helmet like Isabell Werth, but you can still personalise your helmet. Try googling 'horse helmet decal' or 'horse helmet sticker'. You can order a bespoke monogram or silhouette to reflect your style, your horse, your club or a business. Add some bling if that's your thing.

Where altering the physical surface of your helmet may void a warranty or compromise the effectiveness, you can consider a helmet cover. Helmet covers can be purchased in a variety of materials - from velvet to lycra, in plains or patterns. They can be further enhanced with diamantes, personalised designs or ribbon bows. Covers can be a great way to change your helmet look for different purposes - personal and professional.

Wearing a helmet isn't just about protecting your head from a fall. It is about the reality that manure happens – even to good riders, quiet horses and perfect partnerships.

RIGHT: If you can't wear a helmet for yourself, do it for your horses. Photo by Sally Harding.

16. You are an athlete

At some stage, you have probably argued with your non-horsey friends and family about whether or not horse riding really is a sport. Of course horse riding is a sport! How do you prove it? Your sweaty helmet head is a sure sign that you, my friend, are an athlete. Congratulations. Case closed.

17. Hat hair is your friend

Every hair dresser will tell you a little bit of nature's own grease is the secret ingredient to a winning up-style. Plus, the 'helmullet' is, like, so cool right now.

18. Your actions affect the horse industry

We may live in a society where we think we are free to make our own decisions, but you cannot avoid the reality that your decisions impact other people. Even if you don't make money from horse riding, you are part of the greater horse industry and you rely on it.

For example, hospital admissions are used to calculate the risk of horse riding. These statistics inform insurance premiums (for you and riding clubs), but they also impact decisions made by riders or their guardians about participating in horse riding. The equestrian industry relies heavily on participants.

19. You are part of a greater community

You could even prefer the company of animals to humans and you might be the only human inhabitant on horse island, but you can't avoid being a part of society. Every time you are treated for a preventable head injury, you are diverting medical treatment and services (including the ambulance) away from other people – including your friends and family.

20. The times, they are a changing

There was a time when helmets became mandatory for other sports and other occupations, such as working on construction sites. Unsurprisingly, there was resistance to wearing helmets and there were excuses. This was the case with the Australian mining industry over a decade ago.

But, some of the most macho groups have made a transition from a culture where helmets were oddities, to one where they are just part of the uniform or, in the case of motorcyclists, part of their style and identity. So, get on board - no one likes a late transition.

Wearing a helmet isn't just about protecting your head from a fall. It is about the reality that manure happens - even to good riders, quiet horses and perfect partnerships.

If you don't want to wear a helmet to save yourself, do it for the good of your horse and the benefit of other riders. With 20 reasons to put a lid on it, the excuses are looking more and more like, well, excuses. But, if you're still resisting the chrome dome, then at least register to be an organ donor. The process is almost as easy as putting on a helmet.

List of references:

- Appendix A of Safe Work Australia's (2014) 'Guide to managing risks when new and inexperienced persons interact with horses', free download at: https://www.safeworkaustralia.gov.au/system/files/documents/1702/horse-guide.pdf
- O'Brien, D. 'Look Before You Leap: What Are the Obstacles to Risk Calculation in the Equestrian Sport of Eventing?' Free download at: http://www.mdpi.com/2076-2615/6/2/13
- Haigh, L, & Thompson, K. (2015). 'Helmet use amongst equestrians: Harnessing social and attitudinal factors revealed in online forums.' Free download at: http://www.mdpi.com/2076-2615/5/3/373
- Thompson, K., & Nesci, C. (2016). Over-riding concerns: Developing safe relations in the high-risk interspecies sport of eventing. Copy available by request to Kirrilly.thompson@gmail.com
- Busick, J. (2005) Getting Workers to Wear PPE: Communication Is Key, available at: http://www.psandman.com/articles/Busick.pdf

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04-257 | $249.95

The SureFit™ system incorporates elastic straps that self-adjust to the size and shape of the rider's head

Image courtesy Kandoo Equine.

MEET ROMEO

This is Romeo, our case study horse for this training series.

Romeo is a five-year-old Friesian gelding who has been, up until now, enjoying life in the paddock with his herd.

Romeo was gelded as a three-year-old, and had sufficient handling required for veterinary and farrier visits, as well as trailer loading lessons (as required when he moved state six months ago).

Work your horse through each of the foundation lessons and you'll be amazed at the results!

Starting Romeo: Part 4 Shoulder Control and Getting into the Groove

WORDS BY Kate Fenner
BEqSc (Hons)
www.kandooequine.com

In this exclusive training series, Kate Fenner from Kandoo Equine is taking you deep into the essential foundation lessons for any horse.

If you missed Parts 1-3, you can catch up on www.horsesandpeople.com.au or on the following links:

Part 1: https://bit.ly/2HxxDEW

Part 2: https://bit.ly/2GUIoUz

Part 3: https://bit.ly/2jTZCDq

So far, Romeo has learned basic handling, including haltering, grooming, picking up feet, tying up and 'give to the bit', both at a standstill and at the walk.

Join us and watch the un-started, five-year-old Friesian gelding, Romeo, gradually work through each of the lessons - and why not follow along with your own horse?

Whether your horse is un-started or already going under saddle, but you feel these are areas that need a little work, you're in the right place.

Shoulder control

Rather than pushing the horse around - often with a strong leg cue - to move their feet where we want them to go, teaching 'shoulder control' is all about building a dance partner.

Now Romeo has an idea about 'give to the bit' - or pressure-release - and can travel around us, while remaining relaxed and in a soft frame, it's time to start moving the feet in the direction we want them to go.

It's important to start with the 'give to the bit' work because relaxation should always be our priority and starting point. If we don't have this relaxation and softness, Romeo may become anxious when we pick up pressure to indicate a turn and brace against the rein.

1. Why teach this lesson from the reins?

I teach both shoulder and hindquarter control off the reins, which surprises a lot of people. By doing this, I am able to save leg cues for 'go forward' initially and, later, the application of a single leg to indicate a lateral movement. I have found horses prefer a rein cue over the use of leg, as indicated by the frequent tail swishing and ear pinning you see with some horses when leg is applied.

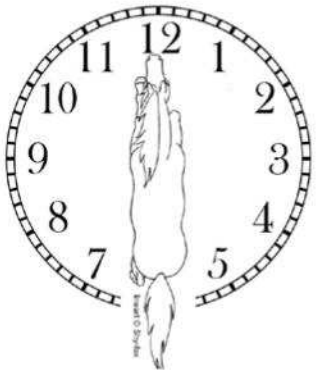
In last month's lesson, we had Romeo walking around us, while maintaining relaxation and a soft frame, but we didn't have much control of where he was going. This next lesson is all about directional control.

Reverse-arc is useful for teaching the horse to carry himself on a circle and not fall in.

Ultimately, when we are riding the horse, we want to be able to move the inside rein towards the neck and have the horse elevate their forehand and step out, maintaining the inside bend of the circle.

This rein movement may only be a matter of the rider moving their hand an inch or less, but we have to exaggerate this while the horse is learning.

By teaching this from the ground, we also help the horse, as we can use our body language after the initial rein cue and before the pressure cue to further assist them.



Clock Work

Imagine a clock under the horse's chest. A horse walking straight forward would step to 12 o'clock with their front feet.

The aim of this lesson is to be able to move the horse from 10 o'clock to 2 o'clock with both front feet, and to be able to do this from both sides of the horse while, maintaining a slight lateral bend of the neck. I call this the reverse-arc.

IMAGE A: Establish forward in same-rein-same-foot (SRSF) before asking for a step in reverse-arc.

IMAGE B: Lift the rein further up the neck and face the horse (the horse should be able to feel the rein touch the neck.

IMAGE C: When you are on the left side of the horse, you are only talking to the left front leg.

IMAGE D: Developing your dance partner – the left rein moves the left front both left and right, while the horse remains relaxed, soft in the bridle and slightly bent to the left.

All images courtesy Kandoo Equine.

Bonus Tip

Rein cues are more readily accepted than leg cues:

I first noticed this when working in the United Kingdom as I was so often in an indoor school. At clinics, when teaching hindquarter control, I would get the participants to teach the horses to disengage their hindquarters using the reins. This was a silent 5-10 minutes of work.

Later, I'd ask them to get the horse to do the same disengaging exercise (stepping one hind foot away in front of the other hind), but this time by placing their hand on the horse's barrel, where their leg would be if they were riding. The arena was suddenly filled with the sound of swishing tails - it was amazing. This was the result of simply placing their hand on the horses' side - no pushing, poking or prodding.

2. Where are the feet moving?

In last month's lesson, we had Romeo walking around us, while maintaining relaxation and a soft frame, but we didn't have much control of where he was going. This next lesson is all about directional control.

Have a look at the clock under the horse's chest on the opposite page. The aim of this lesson is to be able to move the horse from 10 o'clock to 2 o'clock with both front feet from both sides of the horse, while maintaining a slight lateral bend of the neck - reverse-arc.

Let's break it down:

a) Standing on the lefthand side of the horse, with a slight bend in the neck to the left, when walking forward, the horse is stepping their left front to about 12 o'clock on the clock.

b) If we make a small circle around us, the horse will step to 10 or 11 o'clock with their left front foot.

c) When we make the circle bigger, maintaining that slight bend in the neck to the left, the horse will step to 1 or 2 o'clock with their left front foot. Here, the horse needs to step their left front across, in front of, their right front, giving us that lateral movement of reverse-arc.

d) The steps are repeated on the other side of the horse to achieve reverse-arc from the right. In doing so, the horse steps from 2 o'clock initially, all the way around to 10 o'clock as we progress through the lesson.

3. Where do you stand?

Last month, when Romeo was walking forward, I was standing at his shoulder, walking forward with him. That's the perfect position for same-rein-same-foot (SRSF), where the horse simply follows their nose.

When we want the horse to reverse-arc, we can help them by adjusting our position during training.

By moving ourselves forward and stepping into the horse's 'space', we encourage the horse to reverse-arc without having to put any additional pressure on the bit.

Of course, not all horses will respond to this cue immediately, so consistent repetition is important.

The pattern of rein movement, changing your body position and, finally, rein tension allows the horse to respond before pressure is applied - so, slow yourself down to speed up your training.

We want the horse to process the information and learn the pattern. By giving them a second between each step, you allow for this to occur.

4. Where do I start?

Before asking for reverse-arc, it's important to have the horse walking forward in SRSF (see Image A). This establishes the good forward movement needed so the horse isn't tempted to back up (step one front foot behind the other in reverse-arc).

To begin the lesson, stand on the left side of the horse, with the left rein in your left hand, your right hand carrying the whip and resting on the wither, ready to administer a rewarding scratch (see Image A). This is the same position as we discussed last month, but this time, I want you to concentrate on that left front foot (see Image C).

Imagine the clock under your horse's chest. When you are walking forward, they will be stepping to about 11 or 12 o'clock. If you open the rein a little and step away from the horse, they should follow their nose and step to 10 o'clock.

Once you've established 10 and 11 o'clock (SRSF), begin the reverse-arc work by lifting the rein, so it touches the horse's neck, and by stepping forward and towards the horse's neck as shown in Image D.

To begin, just ask for one reverse-arc step, return to your SRSF position and continue with the horse walking around you. Be aware of where that left front is stepping. I often talk to myself: "10 o'clock, 11 o'clock, 12 o'clock, 11 o'clock" and so on, just to make sure I am being really conscious of moving their feet where I want them to go.

The other thing to remember is to always start with SRSF, having the horse walk around you following their nose, before asking for one or more steps of reverse-arc. It will be considerably easier for your horse if they are already moving forward, to make that reverse-arc step.

Remember:

You're teaching a pattern, so your first cue should be the one you ultimately want the horse to respond to - a movement of the rein. In the beginning, we can help the horse by exaggerating this cue and using our body language on the ground to initiate movement in the desired direction. When you ask for reverse-arc, use the following sequence of cues to establish the pattern for your horse:

1. Lift the rein and place it on the horse's neck, half way up the mane.
2. Step forward so you are also halfway between the shoulder and head.
3. Turn to face the horse's neck.
4. Step towards the horse.
5. Apply pressure to the rein.
6. Release pressure when the horse makes a reverse-arc step.

IMAGE A: In the beginning, while the horse is learning the lesson, try to think of it like a puppet movements - open the right rein to move the right foot to the right.

IMAGE B: Close the right rein on the neck to move the right foot left.

IMAGE C: Get forward first and then ask for a reverse-arc step by placing the rein on the neck and moving into the horse in front of their shoulder.

IMAGE D: Establish SRSF and then ask for some reverse-arc steps, making the circle bigger, then go back to SRSF.

All images courtesy Kandoo Equine.

Watch the Action!

Pop along to the website to find the accompanying video of Romeo's first attempts at reverse-arc here:

https://www.kandooequine.com/blog/romeo-shoulder-control

5. Shaping the behaviour

We all know the old saying 'start with your goal and end in a wreak' and it's just as true when we are teaching reverse-arc. Ultimately, we want the horse to step to 2 o'clock with their left front foot, while remaining relaxed and soft in the bridle, bent to the left and with us standing on their left side.

TOP TIP:

Remember this sequence when you are teaching your horse something new:

1. Get the feet to move (walking around you with give to the bit).
2. Get the feet to move in the direction you want them to go (SRSF and reverse-arc).
3. Make it pretty (minimise all cues, especially reducing the required pressure).

However, to get there, we need to shape this response by rewarding a try or a step in the right (also being the correct) direction. By releasing and praising on 12 o'clock, we can build on that.

Remember to have forward movement first, with the horse walking around you, and then ask for the step of reverse-arc. Release and reward any step that is better than the SRSF step. So, if your horse is stepping to 11 o'clock with SRSF and then steps to 11:30 or 12 o'clock, reward that. Next time, ask for another step and you might get a 12 o'clock step followed by a 12:30 step, so release and reward that, and go back to SRSF before asking again.

6. Where does this lead?

As you progress with this lesson, notice how your horse is moving their hindquarter less and less. In the beginning, when you cue reverse-arc, the whole horse is likely to move laterally. Once the horse discovers you are releasing on one front foot only, they will stop moving the hindquarters so much and, eventually, you'll get a pivot on the hindquarters. This will give you independent shoulder control; that is, control of the shoulders that doesn't involve moving the rest of the horse.

Once established, independent shoulder control will allow you to address the hindquarters in a similar way - something that cannot be done until you are able to control the direction of the shoulders.

And, yes, if you're thinking this is the basis of teaching pirouettes for dressage or spins in reining, you're absolutely right!

7. What about 9 and 3 o'clock?

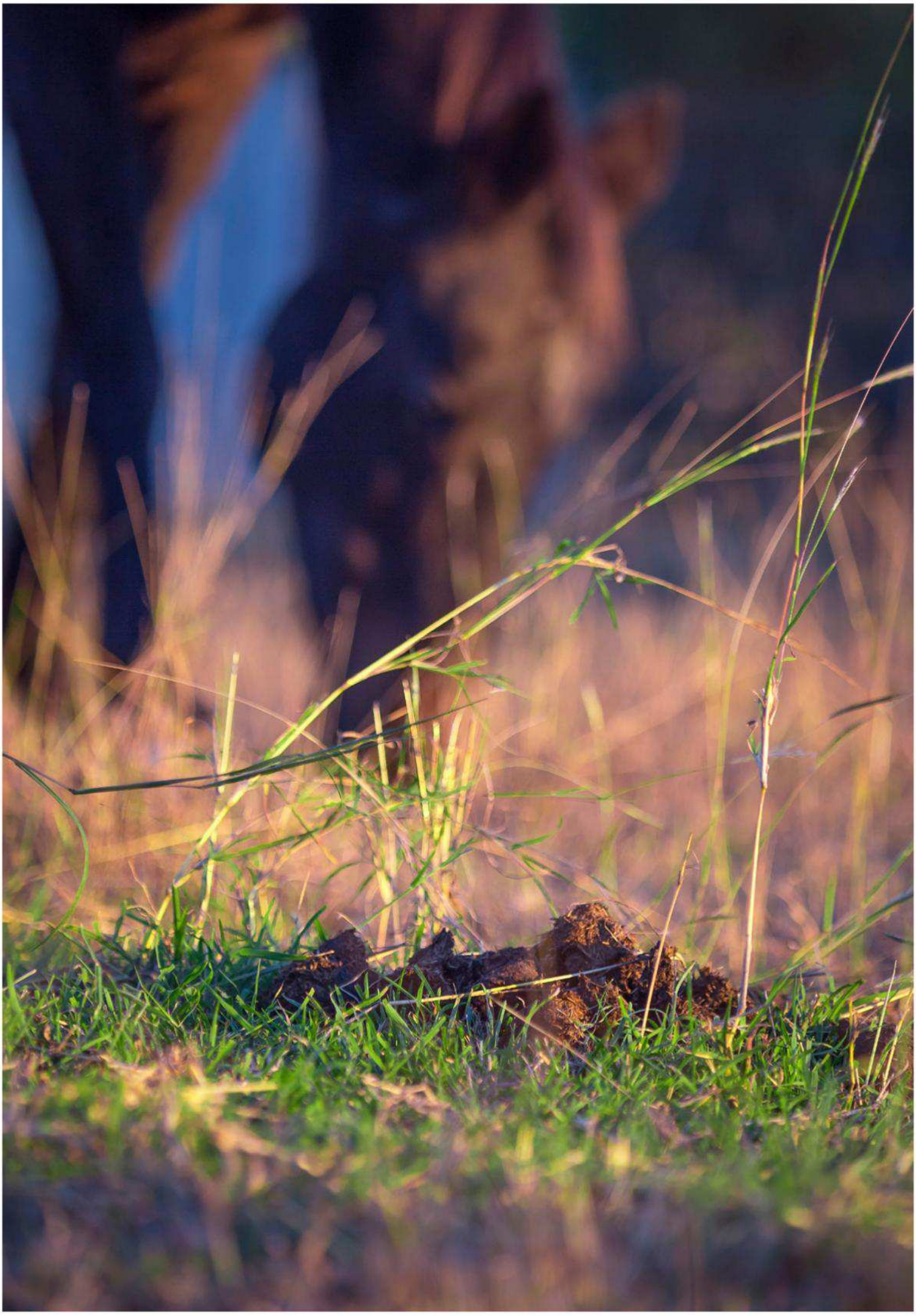
When we're on the ground, it's difficult to get the horse to step to 3 o'clock (on the right) and 9 o'clock (on the left) because we are standing in the way.

Once you're riding this exercise, it's much easier. Begin by really opening the rein, imagining the horse to be a puppet and releasing the rein when the foot steps under your hand.

Full details on how to teach this lesson under saddle can be found in the Shoulder Control Module in the online training course at **https://www.kandooequine.com/**.

Next month...

Next month, Romeo starts to look like a 'proper riding horse' with his first girth. Don't miss this lesson, showing you how to introduce the girth without the stress and bucking that so often accompanies the experience.



The Big Problem With Small Strongyles

WORDS BY Dr Anne Beasley
BAgSc (Hons), PhD
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Wherever you find horses, you'll find small strongyles - otherwise known as redworms or, more precisely, cyathostomins (si-a-tos-tomins).

We refer to these parasites collectively as a single group, although there are actually more than 50 known cyathostomin species, about 10 of which are considered common.

Unfortunately, these intestinal worms and horses are a package deal, and they are usually present in numbers greater than you'd care to imagine.

As far as equine parasites go, cyathostomins are, by far, the most numerous. But, for the most part, they're not the most harmful. Healthy mature horses are able to cope well with moderate and even high burdens; keeping them in check with a primed and sophisticated immune response. Consider the wild Brumbies and Mustangs, who are a reminder horses and parasites have evolved together long before we interrupted the relationship with our fancy anthelmintic drugs.

Under certain circumstances, however, the balance can be tipped in favour of the parasite, which can result in a very sick horse with a poor prognosis. The condition I refer to is aptly named 'cyathostominosis'.

The purpose of this article is not to frighten horse owners into reaching for the worming paste (as many horse worm stories do!), but rather to give you some basic and factual information about the condition and a practical account of the risks involved.

OPPOSITE: Cyathostomins shed their eggs into the manure, the larvae hatch and wait to be ingested by the horse as he grazes. Photo by Linda Zupanc.

Cyathostomins lifecycle

To fully understand the disease condition of cyathostominosis, we need to understand the lifecycle of these ingeniously masterful parasites.

Cyathostomins have what we call a 'direct' lifecycle, whereby:

1. Horses ingest infective worm larvae from the pasture.
2. The worms develop within the gastrointestinal tract to adulthood where they find love, reproduce and shed eggs into the manure.
3. The eggs then enter the environment (pasture), develop and hatch into the next generation of larvae and wait to be ingested by the horse.

There is no migration through the liver, lungs or arteries, like other types of worms; they simply come in one end and leave out the other.

The cyathostomins' site of predilection within the horse is the large intestine (caecum and colon) and, as adult worms, they are fairly mild-mannered, attaching only weakly to the mucosal surface and feeding on organic material. As is often the case, it's the younger horses that are at higher risk of suffering adversely.

Hypobiosis (encysted larvae)

There is a special part of the cyathostomin lifecycle that cleverly enables them to increase their chances of survival by avoiding unfavourable conditions - whether it be harsh climatic conditions outside of the host (too hot or too cold), overcrowding and competition for space in the intestine, a hostile attack by the host immune response or even a dose of worming paste.

Under certain circumstances, however, the balance can be tipped in favour of the parasite, which can result in a very sick horse with a poor prognosis. The condition I refer to is aptly named 'cyathostominosis'

This particular lifecycle phase is called 'hypobiosis' and is a form of arrested development. It takes place when the larvae (L3's) that have been ingested burrow into the intestinal mucosa, become encysted within a protective capsule and simply wait for more favourable conditions to arrive before completing their development.

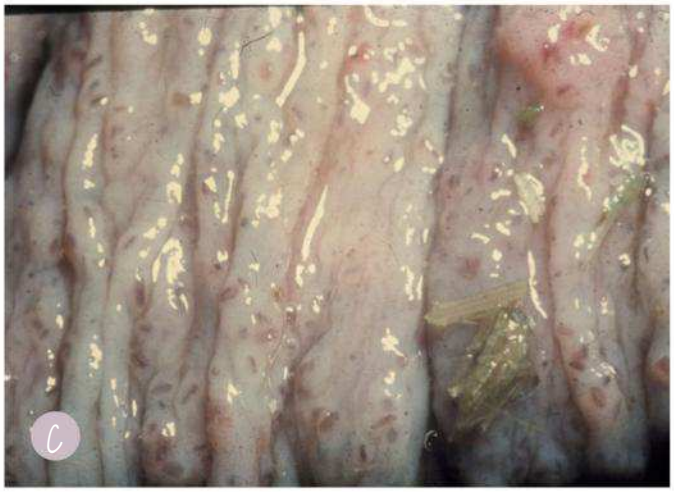
Larval stages have been known to remain encysted anywhere from a few weeks up to 2.5 years!

The process of larval invasion into the intestinal wall is an ongoing and constant challenge for horses as they graze, and it causes some inflammation. However, this pales in significance compared to the damage that is done when all of these arrested larvae - now L4's and 10 times larger than when they encysted - synchronously re-emerge into the gut.

In addition to the physical and mechanical insult to the gut lining, the protective capsule ruptures, releasing substances that cause a massive inflammatory response from the horse.

For the horse, this can result in profuse diarrhoea, dehydration, rapid weight loss, anaemia, a drop in blood protein, leading to oedema (a collection of fluid usually under the belly) and, in about 50% of cases, death.

It's not a pretty picture.



IMAGES A & B: Small strongyle larvae removed from the horse pictured below are visible in the faeces (on the rectal sleeve). He was negative for other pathogens (e.g. salmonella).

IMAGE C: A photo taken at necropsy of a horse showing multiple cysts in the bowel wall, which are encysted small strongyle larvae.

IMAGE D: This horse presented at the clinic showing signs of lethargy, colic and weight loss. Blood tests revealed marked protein loss and ultrasound confirmed marked thickening of the bowel, which was consistent with colitis.

Photos courtesy Dr Anne Beasley.

NEWS

For several decades, scientists have been researching predatory fungus species that exist in the environment and trap the larvae of the intestinal parasites common to grazing animals. Of special interest has been the species Duddingtonia flagrans.

The APVMA has recently approved the sale of BioWorma, a supplement containing D. flagrans that can be fed to grazing animals and acts as a non-chemical biological control for the infective stages of parasitic worms common in sheep, cattle and horses.

Stay tuned as we bring you more in-depth information in future issues of Horses and People.

What causes the larvae to synchronously emerge?

Although the precise trigger for this phenomenon is still poorly understood, we do know both seasonal conditions and existing luminal worm burdens are important influential factors.

What horses are at risk?

Along those lines, a horse with a large burden of encysted larvae which has been de-wormed in the last 1-2 weeks (and is, therefore, advertising 'vacancies' in the lumen of the intestine) at the onset of favourable climatic conditions (for example, Autumn in south-east Queensland) could be at risk of developing cyathostominosis.

Studies have also shown the risk of cyathostominosis is greater in horses under six years of age. But, even within this younger age category, horses differ vastly in their innate susceptibility to cyathostomin infection.

Diagnosing cyathostominosis

A very frustrating aspect of this disease is that we have no diagnostic tools that allow us to easily identify horses at risk or even properly diagnose those presenting with clinical symptoms (although it is reassuring to know researchers are working on addressing this).

The faecal egg count is useless for detecting encysted strongyles, as it only detects the presence of adult egg-shedding female worms and tells us nothing about encysted larval stages. Often a definitive diagnosis can only be made post-mortem.

We can, however, have some impact on reducing the burden of encysted larvae - both directly by worming (when necessary) with an anthelmintic that has some efficacy against these larval stages, and perhaps more importantly, indirectly by managing exposure of our horses to high levels of larval contamination when grazing at pasture.

Can we prevent cyathostominosis?

As my previous articles have acknowledged, worming horses can be a daunting task and there is a mountain of conflicting advice.

When it comes to products with larvicidal efficacy (those that will kill the encysted stages), the list of options is excruciatingly short. And getting shorter.

There are currently only two registered anthelmintic treatments which claim to kill some (and this is important, NOT ALL) of the encysted larval cyathostomins. They are:

- Moxidectin (MOX) administered in a single dose of 0.4 mg/kg (EQUEST or EQUEST PLUS and E-MOX Pro), and
- Fenbendazole (FBZ) given at the larvicidal dose of 10 mg/kg for 5 consecutive days (PANACUR 100).

Whilst the five-day course of FBZ (which belongs to the 'BZ', or benzimidazole, family of drugs) may be an appropriate course of treatment in very specific cases of ascarid (roundworm) infection in foals (a discussion for another day), horse owners should be reminded this drug class has very limited efficacy against cyathostomins, despite the label claims. In fact, the vast majority of properties in Australia and overseas are now home to BZ-resistant cyathostomins.

And, if you are tempted by the logic that a five-day course at a higher dosage will counteract this resistance, there is growing evidence in the literature to suggest this, unfortunately, is untrue.

An additional strike against this treatment option comes from one study that compared inflammatory responses in the gut following treatment of horses with either FBZ or MOX. These researchers found that FBZ treatment resulted in a substantial inflammatory reaction in the gut, whereas the encysted larvae in the horses treated with MOX were resorbed without causing severe inflammation in the gut wall.

Take home message

All this leads us to recommend a single dose of MOX (Equest or Equest Plus) as the drug of choice for treating encysted cyathostomins. However, be aware the efficacy is not, and has never been, 100%. The literature reports various efficacies - ranging from 0% against early L3 larvae, up to 95% against L4 larvae. The take home message here is to refer back to my opening paragraph: horses and cyathostomins are a package deal.

We cannot eliminate them completely, but reducing exposure to high levels of pasture larval contamination and, hence, preventing an excessive accumulation of encysted larvae can certainly reduce the risk of developing cyathostominosis.

Where young horses are exposed to high levels of cyathostomin transmission (for example, cases of high stocking rates and irregular anthelmintic treatment), it may be advisable to use MOX once or twice per year as part of an ongoing worm control program.

Timing of treatments

The best time to administer a larvicidal treatment is when encystment of incoming larvae is high. This happens during times of the year that don't favour larval survival in the environment (in the pasture); for example, during hot Summers in Queensland.

Conversely, in cooler temperate climates, such as Tasmania and New Zealand, where minimum temperatures are frequently below 5°C, incoming larvae are more likely to encyst during the Winter months, emerging in late Winter and Spring to continue their normal cycle of development.

And, of course, adopting an evidence-based, targeted and strategic (ETS) worm control program for the management of cyathostomins in all horses is absolutely fundamental in ensuring we limit transmission of these parasites as best we can. Learn more in the section on good worm control below.

A Good Worm Control Program

Complete eradication of worms from horses is not achievable and nor is it sensible. Rather, a balance should be sought that allows adequate exposure (for the development of immunity) and provides sufficient refugia (to slow down resistance), while maintaining clinical health of our horses. The best way to achieve this is by using an 'ETS' treatment regime; one that is evidence-based, targeted and strategic.

E is for the 'evidence-based' part of this regime, which is based on periodically monitoring faecal egg counts of horses and only worming when necessary. It also means only using drug classes you know are still effective on your property.

There are various diagnostic laboratories nationwide that offer faecal egg counting services, and you can carry out a faecal egg count reduction test by collecting and submitting samples from a group of horses on the day of treatment, and again 10-14 days following treatment. Monitoring is often cheaper than worming a whole mob of horses unnecessarily or with a product that doesn't even work!

T is for the 'targeted' part of this regime, which means identifying those horses on the property that require more frequent treatments and giving fewer treatments to those that are low egg-shedders.

S is for the 'strategic' part of this regime, and comes from applying knowledge about the worm lifecycle and ecology. Timing treatments to pre-empt high-risk seasons and using pasture hygiene, where practical, to break the lifecycle are very effective. Another effective weapon, where available, is to cross-graze horses in rotation with cattle or sheep who harbour different worm species not infective to horses.

Faecal Egg Counts:

There are several options available for testing and you should ask your vet if they offer the service. Alternatively, you can collect your own sample and choose one of the testing labs that can be found online. We recommend Evidence Based Worming and NSW DPI worm test service:

info@evidencebasedworming.com.au
www.evidencebasedworming.com.au

NSW DPI - 1800 675 623 - http://www.dpi.nsw.gov.au/aboutus/services/das/veterinary/wormtest.

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Are You Motivated?

WORDS BY Tanja Mitton
www.tanjamitton.com

How do you get motivated? Have you ever thought about it?

Some people get motivated when they have support and are encouraged, others are motivated when they want to prove to others that they can accomplish a certain task.

We are all different and that's why it is important for you to know yourself.

Two of the main motivators are, 'towards pleasure' and 'away from fear'. Let's have a closer look at each of them and what they mean.

'Towards Pleasure' means the person is motivated by praise. They are looking for a 'feel good' experience. These riders are thriving on compliments, encouragement and reinforcement they do a great job.

A 'towards pleasure' motivated rider will get the most out of a coach who is sympathetic, focuses on the positive and takes their time. This rider will thrive when they develop confidence and feel supported in their efforts.

If you are a 'towards pleasure' motivated person, language like the following really means something to you:

- Well done!
- You can do this!
- Great job for trying!
- I believe in you!
- I am so proud of you!

The coach of such a rider needs to point out the improvements and remind the rider how far they have come. When training, it is better to build the foundations first and take smaller steps when developing confidence.

This is why you should look for a coach who compliments your style of motivation and you should have an honest conversation with them if you find you have different motivations to achieve the end result.

Focusing on the positive results and the improvements already achieved will keep the rider thriving for success.

'Away from Fear' means the person is motivated by success. They are often very competitive and looking to push the boundaries. These riders are thriving on measuring themselves against others, competition and proving they are better than last time.

An 'away from fear' motivated rider does better with a slightly tougher coach, one who is still encouraging, but gets them to dig deeper. This rider will thrive on being pushed out of their comfort zone and prove they can do more than what they thought they could.

If you are an 'away from fear' motivated person, this is the sort of language that really means something to you:

- Come on and get going!
- That's not good enough!
- You have to do better than that!
- You have to earn the success!
- I didn't think you could do that!

In this case, the coach needs to maintain a high energy and work a step ahead of where the rider is at now to show them where they have to get to.

The key is focusing on what it takes to be successful and pointing out where the improvements need to be made.

Which one are you?

Most people (coaches included) will automatically motivate others the way they get motivated themselves.

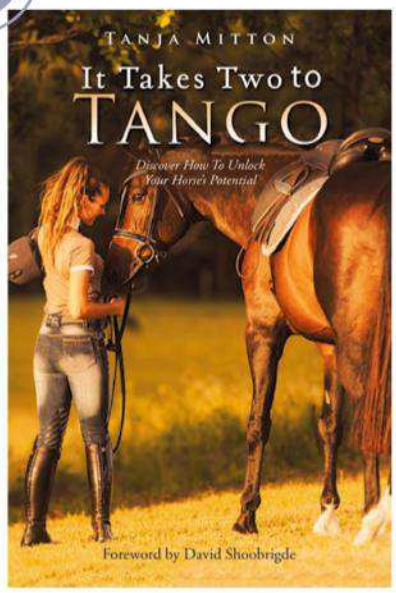
This is why many competitive coaches automatically select a competition-driven, 'away from fear' motivation when teaching other riders. Particularly when preparing that rider to go to competitions. It is important, therefore, to recognise what you need as a rider.

But, many riders are competing without being competitive!

This is why you should look for a coach who compliments your style of motivation and you should have an honest conversation with them if you find you have different motivations to achieve the end result.

Happy riding everyone!

BUY



It Takes Two to Tango

By Tanja Mitton

Discover how to unlock your horse's potential, with Tanja's new book!

Horse riders are often looking for ways to develop, improve and consolidate work with their horses. From pleasure riders to competitive riders, equestrians are always looking for improvement in their skill set.

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OPPOSITE: Photo by Linda Zupanc.

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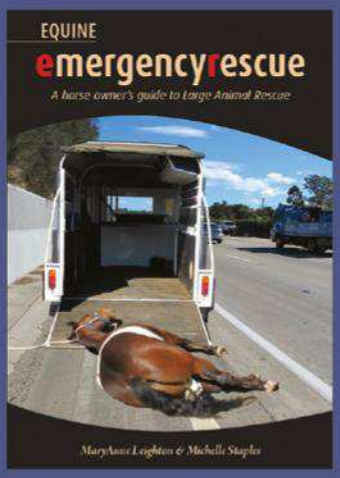

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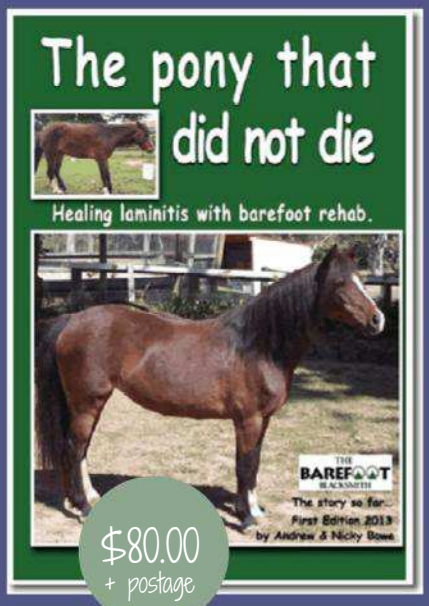
by Andrew and Nicky Bowe



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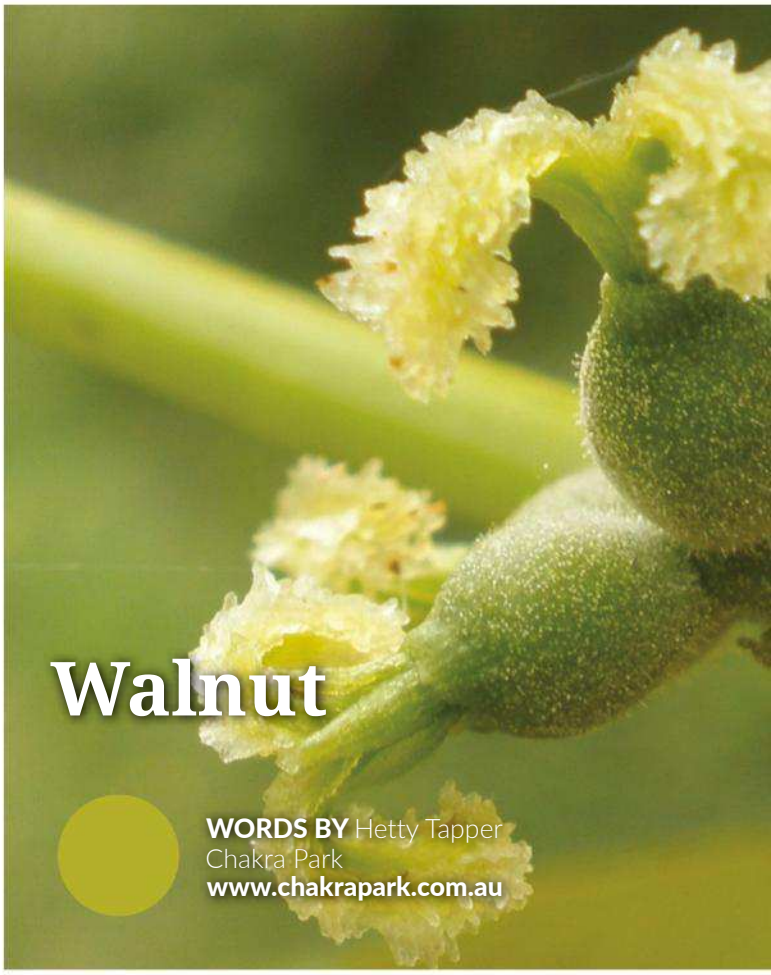

Walnut

WORDS BY Hetty Tapper
Chakra Park
www.chakrapark.com.au

Name: Walnut Bach Flower Essence

Biological Name: Juglans regia

Description: This is the 'Flower of Royalty' and the 'Link Breaker'. It is known to enhance inner strength and stability. It may be given to those being led astray by outside influences - past or present - and those who are going through a time of change and need help to adjust. They may be struggling to cope. It may assist with leaving old habits behind and for those who experience hypersensitivity to their environment. These individuals may also have the tendency to be very easily influenced and often play 'follow the leader'.

Walnut releases negative influences preventing change. It is known to strengthen the aura, providing a feeling of protection and safety. It is a useful remedy in times of transition as it helps to break links with people, places and habits that have a negative effect and drain one's energy. It is the remedy for transition in our lives, the remedy for change.

Positive qualities: Able to accept change and move towards new goals, inner strength, stable, the link breaker.

Patterns of imbalance: Stressed during change and major life transitions, users are easily influenced.

Shown to have benefitted: The virtue of walnut lies in its ability to protect by insulating the horse who feels vulnerable and unsafe, due to changes and readjustments in their environment (difficulty accepting any change). It helps them to adjust to any physical and emotional changes, such as:

- Moving paddocks;
- Adjusting to new owners;
- Adjusting to the new role of mother (after giving birth);
- Following surgery;
- Adjusting to travelling;
- During training;
- Hormonal instability;
- Changes in their feeding regime;
- During weaning;
- During teething;
- Crib biting, weaving and wind-sucking (vices);
- Disturbance by dogs, children or other outside influences;
- Withstanding insecticides, pollutants, pollution;
- Sensitiveness to pollen and grasses;
- Thunderstorms or loud noises, etc.;
- Adjusting to new cycles, be them hormonal or seasonal;
- For foals after birth who are finding it hard to adjust;
- Difficult transitions, including dying - it calms and eases (also refer to Rescue Remedy); and
- New routines - those that are hard to get into a new routine.

Herbal supplements should not replace good management and this article is not intended as veterinary advice. We encourage you to make healthcare decisions for your horse based upon research and in partnership with a qualified equine veterinarian.

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Crustless Broccoli Quiche

WORDS BY Horses and People
PHOTO BY Linda Zupanc

Ingredients

- 2 tablespoons breadcrumbs, dried
- 2 heads broccoli, cut into florets
- 1 red capsicum, seeded and sliced
- 75g low-fat ham, shaved, sliced
- 1 cup low-fat tasty cheese, grated
- 4 eggs
- 1 cup low-fat milk
- 1 teaspoon dijon mustard

To serve

- Salad

Method

1. Preheat oven to 180°C. Spray a 22cm pie plate with oil. Dust with crumbs.
2. Arrange broccoli, capsicum, ham and cheese over base.
3. In a jug, whisk together eggs, milk and mustard, and season to taste. Pour over vegetable mixture. Bake for 35-40 minutes until firm and golden. Cut into wedges and serve with salad.

Image source: www.pixabay.com

Better Equestrian Events

WORDS BY Horses and People

Competing is stressful for all parties involved and absolutely everyone on the day is under some sort of pressure.

This month, we share some tips to help you handle stress better, so everyone can enjoy equestrian events.

Competitors have the obvious stresses of competition nerves; perhaps they may be worried about how their horse will cope with the unfamiliar environment and new competitors don't know what to expect.

Organisers are feeling the pressure to keep the day running, make sure there are no problems, get the scoring done quickly and accurately, keep everyone safe and ensure the competition remains fair for all competitors.

Volunteers may also be feeling the pressure, fearful of doing the wrong thing and not sure what to expect.

So, when you're at your next event and feeling stressed, before you react, pause and remember to walk a moment in the other person's shoes.

- Show organisers: Remember, first and foremost, the point of the competition is for people to showcase their wonderful horses. Taking a few moments to address a competitor's enquiries or offer some supportive words of encouragement will not stop the day.
- Competitors: Remember, your show is being run largely by volunteers. Most of the time, this is not their everyday job. Save non-urgent questions for times when the organisers are able to give you their attention and leave the scorers alone to do their job. Keep in mind, every time someone pops their head into the tent to ask when the scores will be ready interrupts the scorers and delays the scoring.

Respecting the roles that others play at equestrian events goes a long way towards fostering a culture of kindness, tolerance and sportsmanship.

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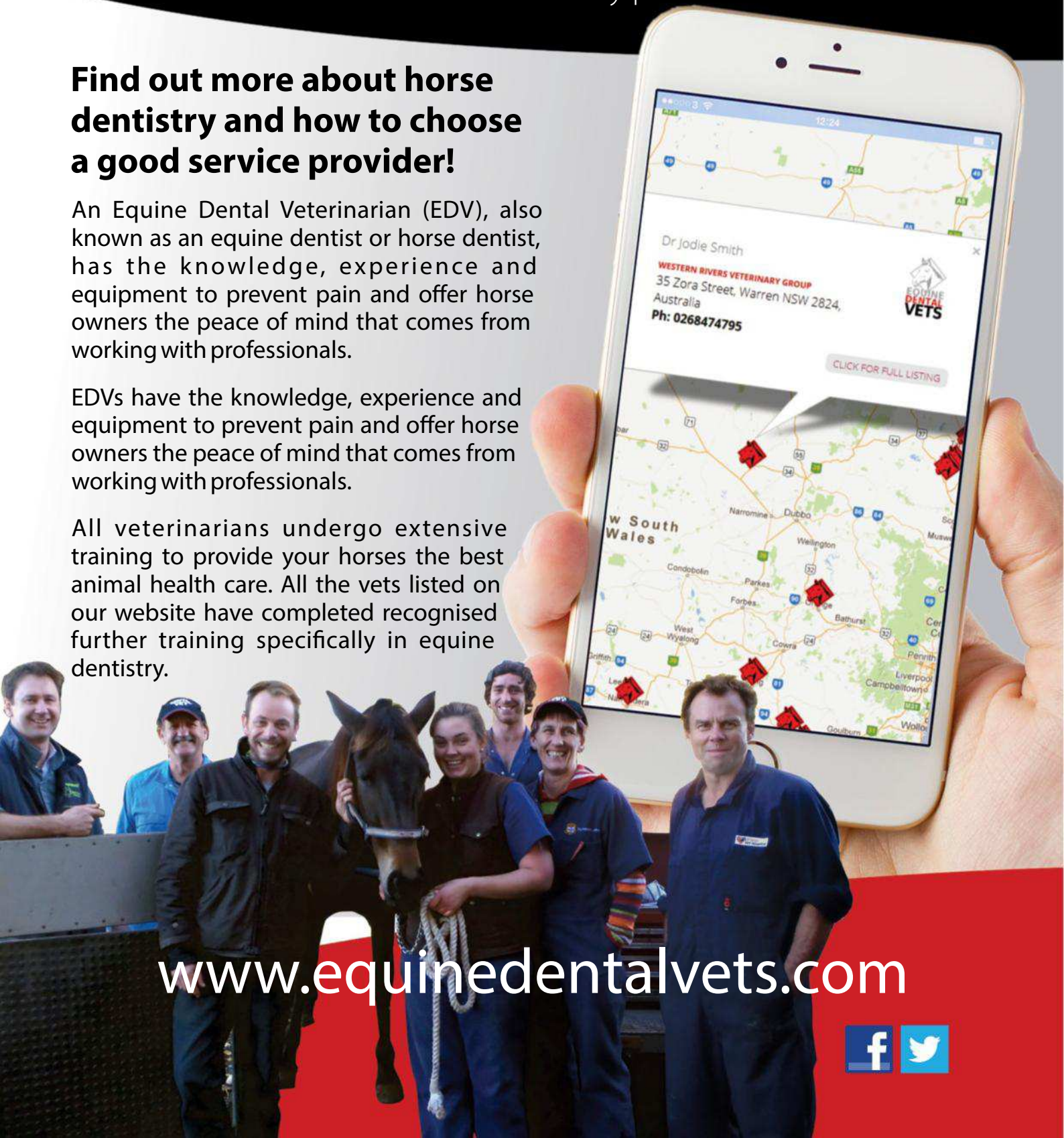

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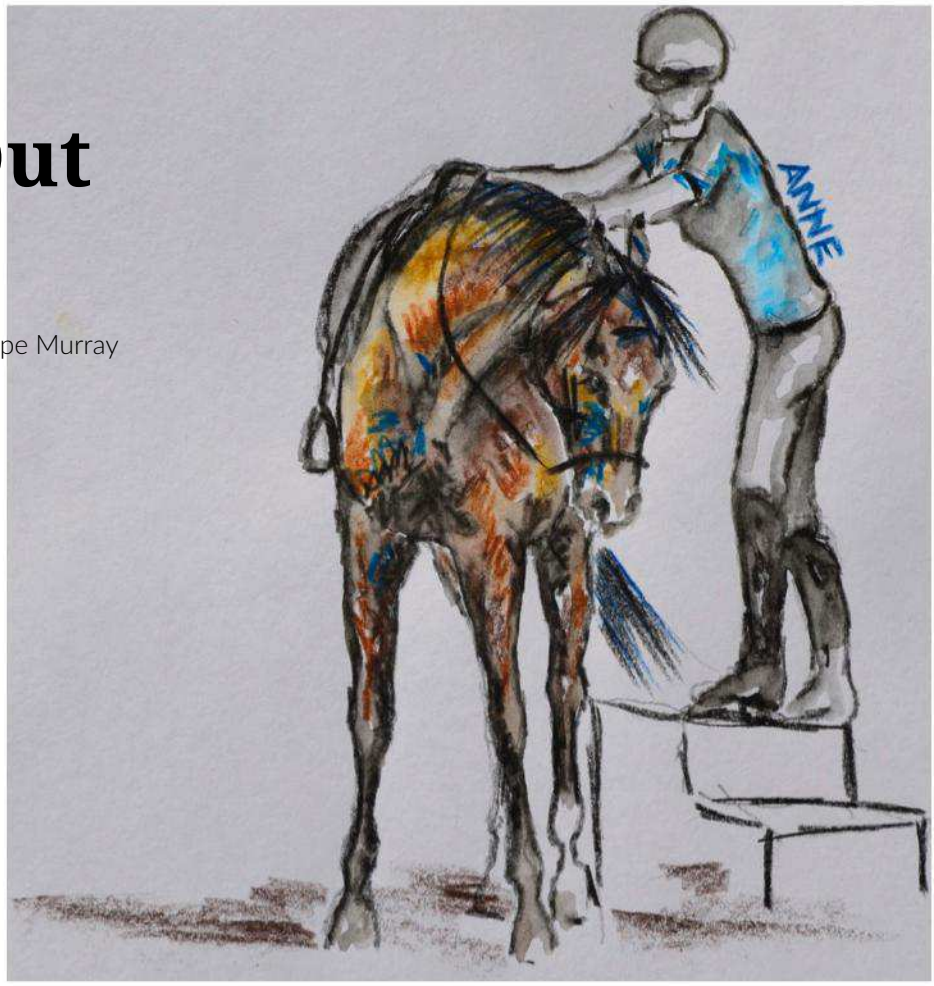
Bottoming Out



WORDS BY Jill Griffiths
ARTWORK BY Anne Penelope Murray

In hindsight, this is what I think happened. Dante was sore. He has a long back and a lean build. At five, he's physically immature. He is growing quickly and his saddle had become tight on his shoulders in the three months since it had last been adjusted.

His soreness corresponded to me injuring my knee (not horse-related). As we were both developing our soreness issues, I made a couple of mistakes. I can see them as mistakes in hindsight, but at the time didn't realise I was doing the wrong thing. In fact, I thought I was doing the right thing.

I mistook Dante's behaviour as adolescent tantrums, so determinedly rode him through them. I now believe the problems began due to soreness from his saddle becoming tight. At the same time, I underestimated the difference my sore knee was making to my riding. (And, as it happens, the damage continuing to ride was potentially doing to my knee, but that's another story.)

In thinking that Dante was just 'acting up' and that I was riding just fine with my sore knee, I continued to ride and to push him on when he was telling me he didn't want to go on. When it finally clicked in my head that he was sore, and I realised also that continuing to ride with my sore knee was plain stupid, I stopped riding. I'm not talking months of doing this - it was maybe three or four rides.

But, along the way, I managed to teach him that if he put his ears flat back, and threatened to bite and kick me when I went to get on, he could get out of being ridden. I also inadvertently taught him that it hurts to be ridden. It's amazing how quickly a horse can learn undesirable behaviours. My beautiful, friendly, gentle young horse wouldn't stand at the mounting block without threatening to take me out - either with his teeth or his hind leg.

Even after Dante had been treated for his soreness and I had been assured he was no longer sore, the issues remained; it was learned behaviour and expectation on his part. I was devastated. I felt completely incompetent and was convinced that I had ruined him.

The great thing about bottoming out is the only way forward is up. I'm fortunate in having great support in my equestrian endeavours - good friends who encourage me and great professionals who I can call on for help.

So, I limped to the sidelines (actually, I limped to the physio and got my knee sorted). I called in some professional help. After the bodyworker had ironed out Dante's sore muscles and set him straight, our trainer, Sam, worked him through the learned behaviour to convince him - and me - we could get past this.

She set us homework to go along with the advice from the bodyworker. Bootcamp for Dante: Groundwork, not riding (which my physio agreed with - she outright laughed at me when I asked if I could go and ride my horse!). Pole work and lungeing, slowly building muscle. Carrot stretches. A muscle building supplement. The saddle fitter adjusted his saddle again.

We're working on building his topline; developing his frame. Already four weeks into our 'bootcamp', he's looking softer and rounder. I can feel the difference across his back as I brush him down. I'm back in the saddle, taking it slowly, mostly riding at a walk to protect my knee. There is so much to work on at a walk! We're working on lateral movements, flexibility and responsiveness; building Dante's gymnastic strength and exercising his brain. My knee can now take short - and I mean really short - stretches of trot. I'm focusing on my balance, helping him to maintain his. I can feel the improvement in the way he is carrying himself, the way he is carrying me.

Slowly, slowly, we're climbing up the other side of our trough. I'm a better horseman for this glitch. I'm determined Dante will be a better horse for it as well.

Green Pony chronicles the adventures of Jill Griffiths and her young horse, Dante, who Jill 'accidentally' bought as a yearling in 2014. The first instalment appeared in Horses and People in February 2016 and the series continues monthly. To catch up on past Green Pony blogs, head to our website: www.horsesandpeople.com.au.

NEXT ISSUE

Image courtesy Kandoo Equine

horses and people

JULY 2018

- **Respiratory Conditions:** In the first of a 3-Part series, Dr Katelyn McNicol outlines the anatomy of the respiratory tract and respiratory conditions affecting the equine athlete.
- **CONTINUED: Starting Romeo:** Kate Fenner from Kandoo Equine continues to progress the foundation trainining of the 5-year-old Friesian Romeo. Follow along with your own horse as Romeo works on shoulder control and turns.
- **CONTINUED: All About Soils Series**. Permaculture consultant and equine nutritionist Dr Mariette van den Berg wraps up the series with some of the easiest and most sustainable ways to improve your soil health.
- **CONTINUED: Horse Facility (re)Design:** Leonie Lee returns in the July issue to continue challenging the traditional design and construction of horse facilities - and puts forward some innovative improvements!
- **And Lots More!** Don't miss the July 2018 issue! Once again, it will be packed with quality stories brought to you by our wide panel of expert contributors.

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